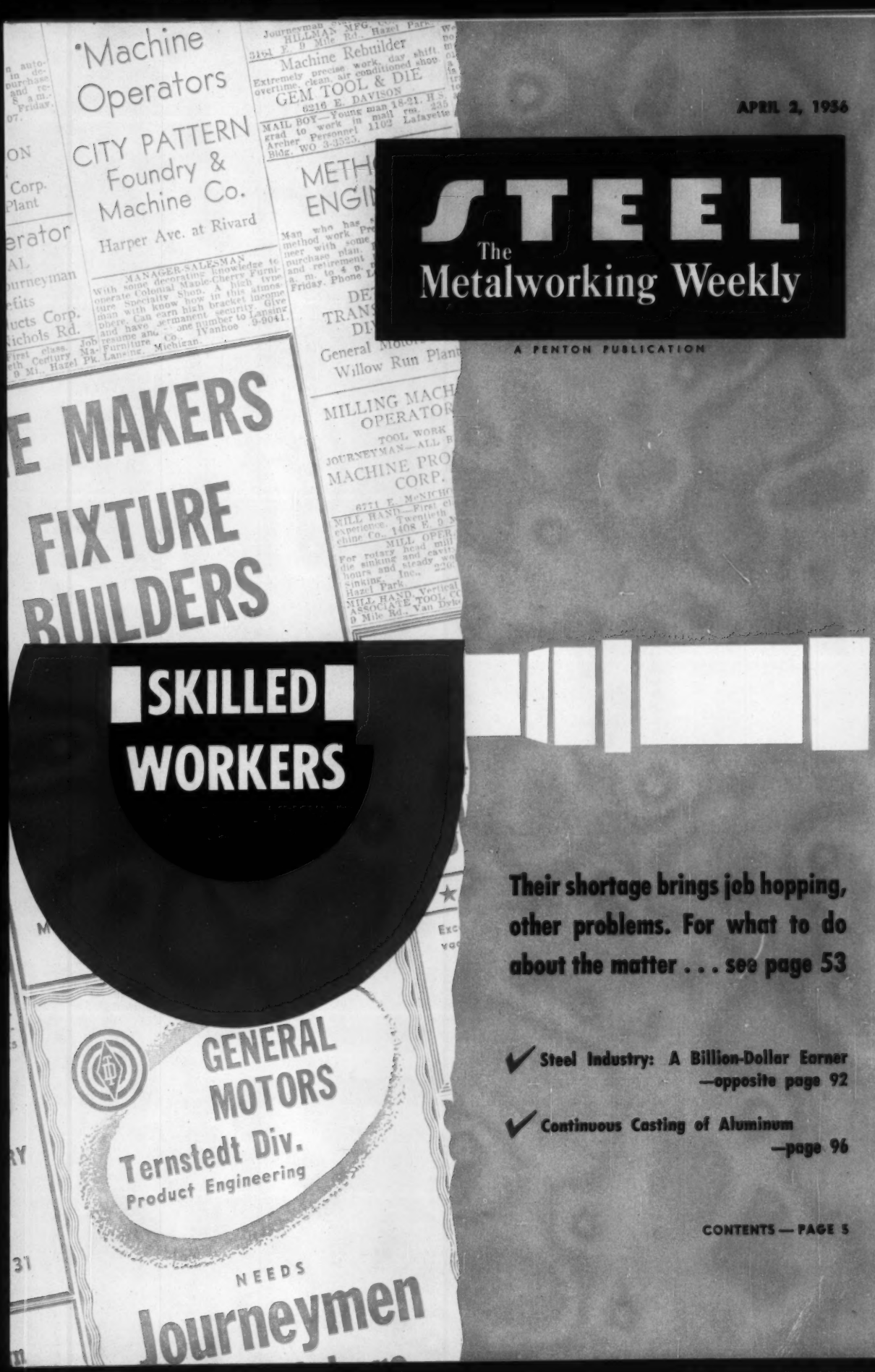
APRIL 2, 1936

STEEL

The Metalworking Weekly

A PENTON PUBLICATION



Their shortage brings job hopping, other problems. For what to do about the matter . . . see page 53

✔ Steel Industry: A Billion-Dollar Earner —opposite page 92

✔ Continuous Casting of Aluminum —page 96

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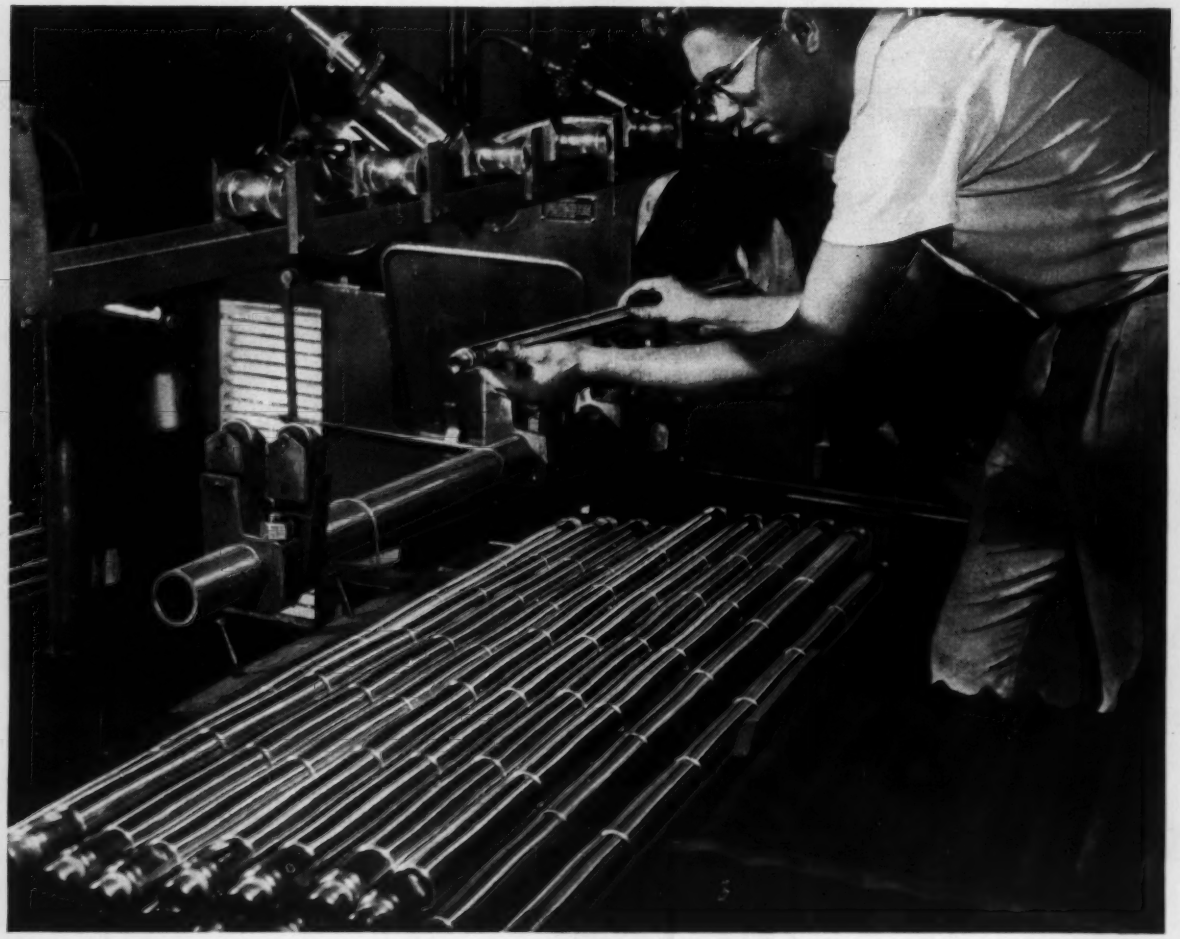

THREE SIZES OF TUBING IN ONE PUMP ... PRECISELY!

Like so many products, the deep well reciprocating pump manufactured by Fluid Packed Pump Company of Los Nietos, California, is practically all tubing with the exception of fittings used on the end. And because the pump's components are received as tubes—semi-finished products in themselves—they require much less fabrication than would otherwise be necessary.

For the past 10 years, this company—an acknowledged leader in its field—has used B&W seamless alloy steel mechanical tubing for its product which pumps oil up from subsurface areas of wells. The barrel and plunger of the pump are precision parts which must be held to extremely close tolerances if they are to function properly. The uniform size, wall thickness and concentricity characteristics of B&W Tubing, with its surfaces free from spiral, scratches and pits, combine to make this tubing ideally suited to the Fluid Packed Pump operation.

A closer look at your own product, from both a design and fabrication standpoint, may reveal opportunities for tubing applications that may save time and money and improve your product. Whatever your requirements, B&W Tubing—carbon, alloy or stainless—can meet them. Call Mr. Tubes, or write for Technical Bulletin 365. The Babcock & Wilcox Company, Tubular Products Division, Beaver Falls, Pa.

TA-5024M

Seamless and welded tubular products, seamless welding fittings and flanges—in carbon, alloy and stainless steels

Making a carbon-steel bar into a hard-hitting hatchet

It's surprising but true: this hatchet is made from a round bar of carbon steel. Expert craftsmanship by The Bridgeport Hardware Manufacturing Corp. transforms the bar into a rugged tool that is well known to outdoorsmen everywhere.

Starting with a 1¾-in. round of C-1078 steel—one of the carbon grades supplied by Bethlehem—the Bridgeport people hammer-forge the rough pattern shown above. Then the flash is trimmed, resulting in a slender but strong forging, all one piece from head to handle.

Next comes heat-treatment, the vitally important step that gives the ax its ability to hold a keen edge through years of punishing service.

The finishing operations include polishing, sharpening and painting, as well as installing grips of tough, second-growth hickory.

The requirements of hand-tool makers, as well as those of many other active and growing industries, have created an unprecedented demand for hot-rolled carbon-steel bars. We're doing our best to meet this demand, all the while maintaining our customary quality standards.

For further information about carbon bars, kindly contact the Bethlehem sales office nearest you.

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On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

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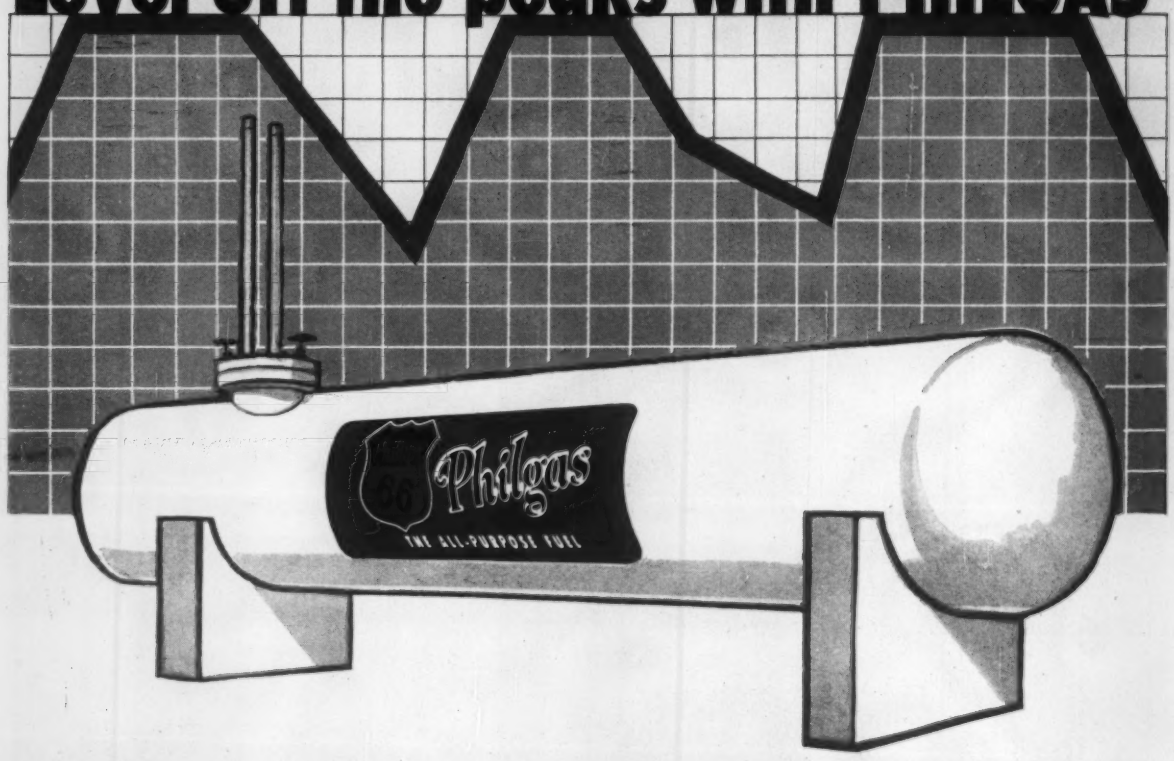

Avoid high demand charges for gas by installing your own

STANDBY PHILGAS *SYSTEM*

Peak-shaving with a standby Philgas system is like having your own gas well. You can put Philgas into operation without delay when your gas needs threaten to exceed your contract limitations for natural or manufactured gas. Installing a Philgas system is easy and requires little capital investment. It is automatic in operation.

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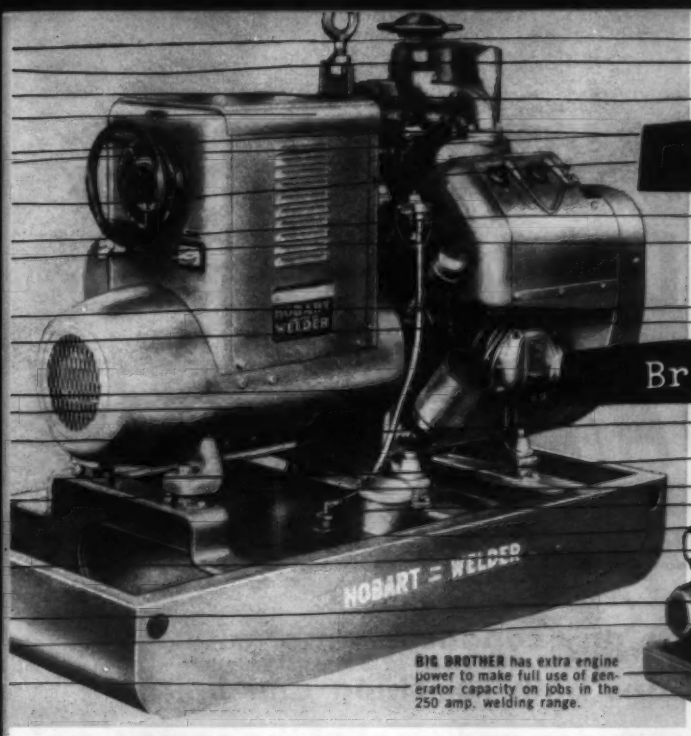

BIG BROTHER has extra engine power to make full use of generator capacity on jobs in the 250 amp. welding range.

Lowers Welding Costs!

Speeds Fabrication!

Brings EXTRA PROFITS

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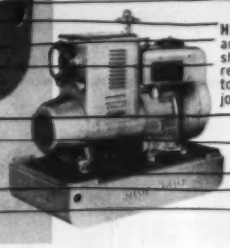
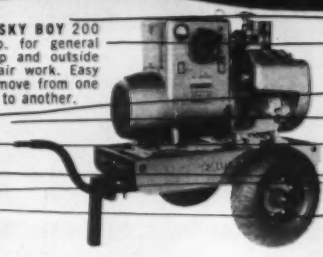


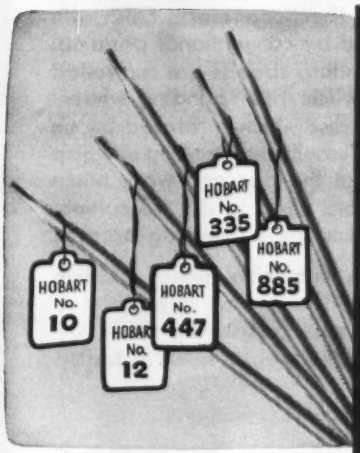
HUSKY BOY 200 amp. for general shop and outside repair work. Easy to move from one job to another.



AC POWER—AC WELDER 200 amp. for general service welding or power for operating drills, lights, grinders, motors, pumps, etc.

You'll like the new advantages you get with

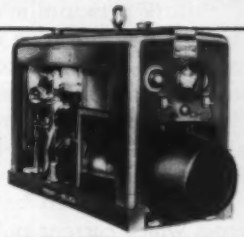
HOBART ~~air-cooled~~ welders



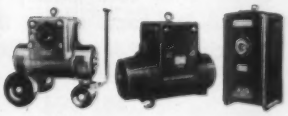
Modern type arc welding
ELECTRODES

. . . that give you faster production. If you haven't checked the advantages of the latest advancement in welding electrodes, you'll want to try these NEW HOBARTS.

- easy striking arc
- lower finishing costs
- faster metal deposit
- lower spatter loss



"CONTRACTOR'S SPECIAL"—a 250 amp. Gas Drive model that's light and compact, yet has plenty of engine power and a hot, fast, dependable arc.



Electric Drive Welders | "Powromatic" DC Rectifier

"Bantam Champ" | Generator Only | Transformer Welder

YOU HAVE YOUR CHOICE WITH HOBART

Here's the best way to produce superior welding at less expense: Choose a welder that's especially designed to do your work. And this is equally important: before buying that welder, find out if it's rugged enough to give you years of trouble-free service.

Do some close investigating and you'll quickly see why Hobart welders are outstanding. Each welder in Hobart's complete line has extra "muscle" in the form of rugged construction, constant top performance, easier arc control, extra capacity and cooler operation.

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☐ GENERATOR ONLY ☐ TRANSFORMER

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STREET_____

CITY_____ STATE_____

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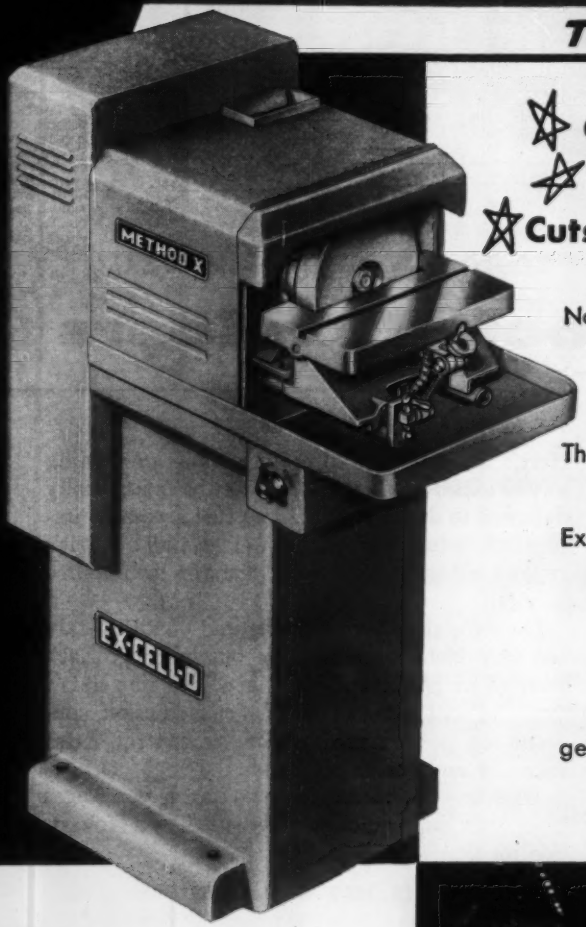
Save the Cost of Diamonds with

EX-CELL-O Method X TOOL SHARPENER



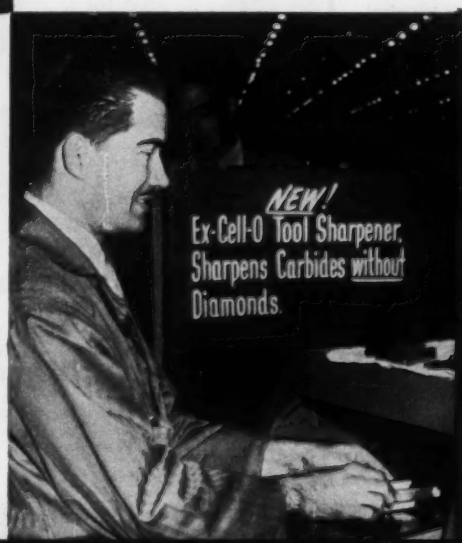
Style 43 Ex-Cell-O Method X Tool Sharpener.

- **Cuts any conductive material**
- **Does both roughing and finishing**
- **Cuts carbides and steel at the same time!**

Now you can sharpen the hardest single-point tools without using diamonds or abrasive wheels. Using the electro-spark principal in off-hand sharpening, Ex-Cell-O Method X produces a non-directional matte finish with none of the abrasions caused by conventional grinding. The coarseness of texture and cutting speeds are controlled by an electric control switch. The "grinding wheel" is actually a 10" cast-iron disc which is rotated by an Ex-Cell-O precision spindle with inbuilt motor. A spark gap is maintained between the disc and work piece across which current pulsations jump to do the cutting. No coolant is required in the sharpening process.

After brief instruction, men with conventional grinding experience can readily adapt their skill to Method X. Get all the facts about this new cost-saving process—get in touch with your local Ex-Cell-O representative today.

Popular at the Show. **At the Machine Tool Show, hundreds of men were impressed by this diamondless tool sharpener that lengthens the life of carbide tools because it leaves NO heat checks, NO grinding cracks, and NO saw-tooth Cutting edges.**



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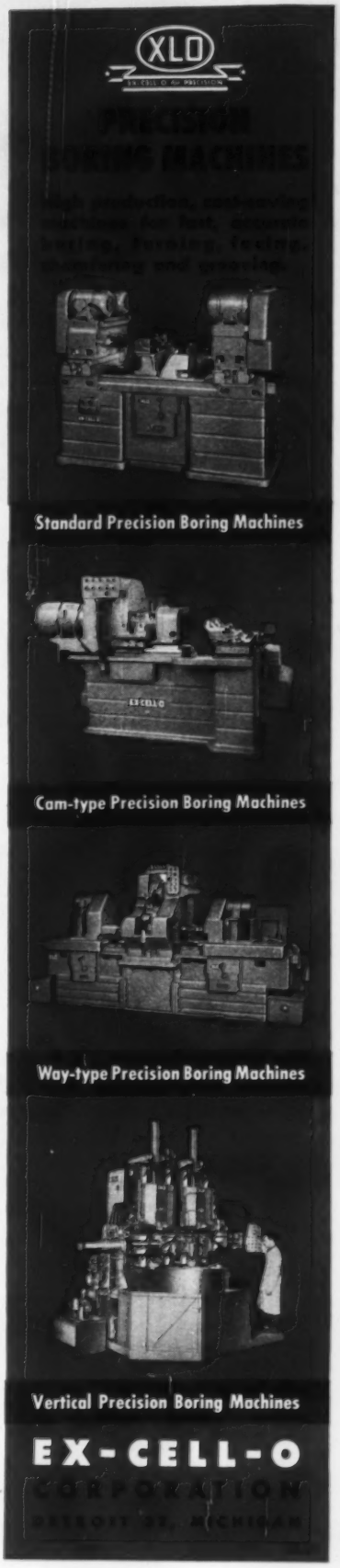

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Dust causes wear, damages bearings, bedways, slides and saddles and other "sensitive" machine parts. Clean machines hold close tolerances better and need re-grinding or alignment only ⅕ as often. In five years, users of Torit dust collectors save up to $1,600 in re-grinding the ways of the average grinder—and save hundreds of dollars *more* in down-time.

MANY COMPACT MODELS . . . all self-contained. Unitized for custom installation. More economical, usually more efficient than central (built-into-the-building) systems. For more information, write today to . . .

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Sweet's

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behind the scenes

Editor Meets Tree

Thanks to dedicated men who stood waist-deep in snow drifts armed with cold determination and strong magnifying glasses, we know that the various types of snow crystals do not occur with equal frequency. This may knock you right off your feet, friends, but the news is out: In any given snow storm you simply won't find as many columnar snow crystals as you will the tabular type. Over a large part of the country this week a great mess of these crystals lay heavily upon the land, and the only person we knew who deliberately snuggled up to them was Associate Editor Robert Jaynes. He wasn't counting the crystals, though; he was sliding on them.

This may sound preposterous, but Bob was sailing around on a flying saucer when he ran into a tree that was sticking about 40 ft out of the snow. The flying saucer is a deep metal dish, almost large enough to accommodate a plump young editor curled up with an apple in his mouth. This particular dish belonged to Jaynes's son, but daddy had to try it out first on a snowy hillside. He stepped aboard, folded himself yogi fashion, and set off down the hill like an oversized and whirling apple dumpling. Having no control over his weird vehicle, he crashed into a sturdy oak. His elderly playmates tried to snap his shoulder back into place, an episode he remembers with no pleasure.

"I heard it click," said Bob, reaching into the sling that held his arm, plus things usually carried in his right pocket. "And I want to tell you that's the last time I want to click in a flying saucer!"

Those Good Old Days?

Robert Huber, STEEL's alert machine tool editor bobbed up with a worn copy of Warner & Swasey's *Turret Topics*, dated December, 1955. "It might be out of date," Bob explained, "but that's because I held on to it so long. Just take a look at this story about the good old days, and be glad you ain't living 50 years before your time." He looked closely at our seamed and weathered countenance, and added: "Or have you?"

When Wanamaker's department store in New York closed its doors a year ago, writes the editor of *Turret Topics*, somebody dug into the records, and found this notice which appeared on the store's bulletin board in 1854:

"Store must be open at 6:30 a.m. and remain open until 9 p.m. the year round . . . A pail of water and a scuttle of coal must be brought in by each clerk before breakfast, if there is time to do so, and attend to customers who call.

"This store must not be open on the Sabbath unless absolutely necessary. Any employee who is in the habit of smoking Spanish cigarets, getting shaved at the barber shop, going to dances and other places of amusement will most surely give his employer reason to be suspicious of his integrity and all-around honesty. Men employees are given an evening a week for courting purposes, and two if they go to prayer meeting regularly. After 14 hours of work in the store, the leisure time must be spent in reading good literature."

Pass the Aspirin

A moment ago we were speaking of plump young editors, which reminds us that Keith Carlson, associate editor of *Machine Design*, was kind enough to contribute a puzzle. "I stole it from the *Georgia Tech Engineer*," he confessed blandly, handing over the purloined problem. "It's so good, I think it ought to have wider circulation. I figured out the answer myself. Can you?"

Certainly not—but you bright people out there can work it. Two studios were furnished only with chairs and three-legged stools. Each studio was furnished differently. If all the legs in each studio were stools, and all the stools were chairs, and all the chairs were removed, there would be 100 too many legs in each studio. How were the studios furnished?

Shrdlu

(Metalworking Outlook—Page 47)

New...

ELPAR RAM TRUCKS

ONLY THE "R" SERIES RAM TRUCKS GIVE YOU SO MANY VALUES!

ELPAR designers and major steel mill engineers worked together to design this brand new line of coil handlers.

These trucks combine the best of previous models, plus new features learned from over thirty years' experience building heavy-duty ram trucks. You can count on "R" series ram trucks to handle more tons per hour than ever before!

Check These Design Features:

Narrowest Ram Truck Built . . . Get more efficient use of storage space and operate in narrower aisles.

Power Actuated Hydraulic Wheel Brakes . . . Actually two independent braking systems for maximum safety.

Picture Window Vision . . . Lift chains are eliminated for perfect vision between uprights.

Countless Safety Features . . . You'll find it hard to count all the features that assure safety to the load, operator and truck.

Dual Power Plants . . . Maximum power and flexibility. Drive motors are fully protected inside the frame.

The "R" series ram trucks will surprise you with their dependability, safety and economy.

Ask for new bulletin—"R" Series Ram Trucks.

Close-up of operator's field of vision. Note how clearly he can see the tip of the ram, for easy spotting of loads. Controls permit right, left or center operation.

Available in Capacities From 20,000 to 80,000 lbs.

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From the World's Most Complete Line . . . your MORSE-FRANCHISED DISTRIBUTOR can recommend the correct cutting tool for every job in your plant . . . regardless of tool requirements

There's the whole Morse story right there in a nutshell. And it simply means that whatever you need for any job . . . carbon, high-speed or tungsten carbide, you can get it from your Morse-Franchised Distributor.

What's more, it means that Morse can give you, consistently, the lowest cost-per-cut you ever experienced. That's why it always pays to call your Morse-Franchised Distributor . . . because he's the one man who can give you "The Most" in cutting tools . . . and that means nobody (*but nobody*) but Morse! *Call him now.*

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MORSE
means "THE MOST"
in Cutting Tools

PRODUCTION PLATING WITH UDYLITE-SELENIUM

75,000 amperes of Rectification with push-button control

In this ultra-modern automatic plating operation the rectifiers selected were Udylite Selenium—with a total output of 75,000 amperes.

30,000 amperes at 2 to 9 volts are used alone for the nickel plating operation. These selenium rectifiers are controlled automatically by a single push button control. No matter how much work is in or out of the tank, the amount of voltage is automatically adjusted to remain constant.

The chromium plating is equipped with 9 volt selenium rectifiers. Each rack of work goes into the chrome plate "live" at approximately 3 volts. When the racks arrive at the bottom of the down stroke a strike voltage of 9 to 18 volts is applied for a few seconds—then the voltage is lowered to regular plating voltage —and it's all done automatically!

Udylite has engineered hundreds of similar installations of all sizes for all kinds of metal finishing operations. Why not call on this experience for your rectifier problems—either Selenium or Germanium? Write us today.

THE Udylite CORPORATION
DETROIT 11, MICHIGAN

WORLD'S LARGEST PLATING SUPPLIER

LETTERS TO THE EDITORS

Board Sees STEEL Slides

Slides of the illustrations in your article, "What Metalworking Management Expects in 1956" (Jan. 2, page 105), were presented to our board of directors recently. These slides not only gave our directors a greater insight into the metalworking industry's outlook for this year but also helped to instill greater confidence in our prognostications and program for 1956.

Anthony J. Zino Jr.
Vice President-Sales
Dixon Sintaloy Inc.
Subsidiary of Joseph Dixon Crucible Co.
Stamford, Conn.

Why Be Robbed of Profits?

I think your article, "Know Your Costs" (Mar. 19, page 83), is well done, and I send my congratulations to you. I am routing it among our accounting personnel since there are some factors listed which I feel are important to this company.

Frank Griesinger
Assistant Treasurer
Lincoln Electric Co.
Cleveland

I feel this article is timely. It was of interest to me since it dealt in part with foundry cost problems. I would appreciate ten copies.

P. L. McCulloch Jr.
President
Electro-Alloys Division
American Brake Shoe Co.
Elyria, O.

This article can help me in my work. We are working on the installation of a cost standard system, and I have found several features in your story which can be of help to me. I would like two reprints.

Herman W. Kaus
Standard Cost Department
Creamery Package Mfg. Co.
Lake Mills, Wis.

Statement Brings Rebuttal

Your article, "Scale Sales Get Fatter" (Feb. 27, page 81), makes this statement: Mechanical scales have an 0.1-per-cent-accuracy rating, while electronic scales are accurate to 0.25-per cent.

As the primary manufacturer of the SR-4 bonded strain gage type of load cells used in the majority of electronic scale installations, we would like to take exception to this statement.

We are producing standard load cells that are guaranteed to 0.1-per cent or better and have made scale installations that comply with the *National Bureau of Standards Handbook* H-44 tolerances

(Please turn to page 12)

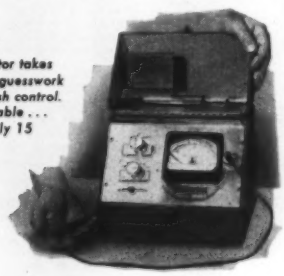
When does surface smoothness begin to waste your money?

In most plants today when a design engineer specifies a certain finish for a part, no one in production knows whether the part will be overmachined, O. K., or too rough until that part reaches the inspection department.

By then it is too late.

The costly consequence is that the company loses money on every part finished too well, AND on every reject resulting from underfinishing. Surface finish begins to waste your money at two precise points . . . *the moment you finish a part a single microinch better than the job requires, and the moment you finish a part a single microinch worse than required.*

Surprising as it may seem, most in-process checking today consists of judging how the finish *looks* and how it *feels* because no accurate, portable, in-process checking equipment has been available. The production department had no tool that could instantly tell the machine operator when he had met the specification.



The Brush Surfindicator takes the costly guesswork out of finish control. Fully portable . . . weighs only 15 pounds.

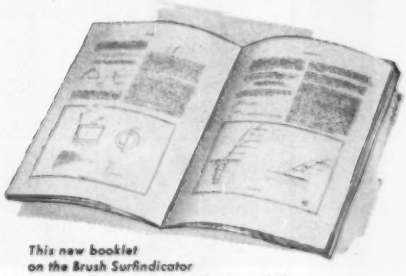
What has been done?

Brush has developed an amazingly rugged electronic surface measuring device called the SURFINDICATOR* which can be carried anywhere in the shop to obtain an instantaneous, accurate in-process measurement of roughness on any surface – flat, round or inside-a-hole.

Now you can set up optimum specifications for surface finish based on your laboratory or pilot model tests . . . and then hand a reliable instrument to the production department to help them meet those specifications with no waste of worker or machine time. You can mount SURFINDICATORS at each machine or set up checking stations throughout the plant. And your regular machine operators can use them . . . it doesn't take an expert.

How It Works

All the user does is pass the stylus over the surface in question and take a direct reading. It's simple, fast, accurate and above all it's practical . . . for metallic surfaces and for glass, porcelain, plastic, paper and other materials.



This new booklet on the Brush Surfindicator includes the new ASA standards . . . will help you establish economical surface finish control.

You should know all about this portable device, its many, many uses and the savings it can mean to your company. We tell the whole story in a new booklet which also includes the new ASA standards on surface finish for industrial use. Write for your copy today on your company letterhead. *T.M.

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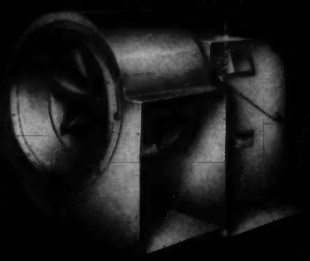

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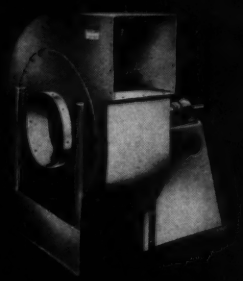

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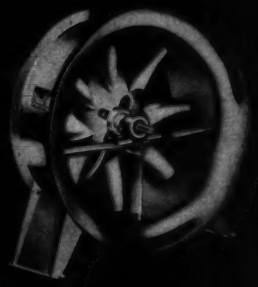

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WESTINGHOUSE AIR HANDLING

YOU CAN BE SURE...IF IT'S Westinghouse

J-80581

LETTERS

(Concluded from page 10)

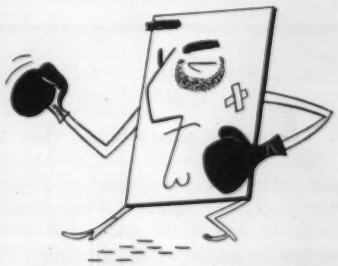
for scale accuracies, requiring an acceptance tolerance of 0.05-per cent.

Admittedly, electronic weighing is new to industrial applications, and the technology of electronic weighing is in its infancy, but the fact remains that this type system is quite capable of meeting the current standards of scale accuracy.

The real problem is in proper interpretation of existing tolerances, which have been written for mechanical scales, when applied to electronic scales.

H. A. Nielsen
Assistant Product Manager, SR-4
Baldwin-Lima-Hamilton Corp.
Cambridge, Mass.

Titanium Makes Comeback



We have noted with interest the article, "Titanium Gets Second Wind" (page 69), in your Feb. 27 issue. We feel this is a fair and up-to-date appraisal of the position of titanium and would appreciate three copies.

Roy G. Roshong
Director
Works Laboratories
Heintz Mfg. Co.
Philadelphia

I would appreciate three copies. This material would be useful as a summary reference for the casting design-process manual which we have in preparation for the Air Force.

J. D. Dunbar
Associate Project Director
Casting Potentials Project
Air Materiel Command U. S. Air Force
Alloy Engineering & Casting Co.
Champaign, Ill.

Gratitude for Quick Service

Thank you for your quick service in sending us reprints of the article, "Automakers Take to Aluminum Trim" (Feb. 27, page 110). This article proved useful and informative.

T. A. Downey
Analytical Chemist
J. C. Miller Division
Hanson-Van Winkle-Munning Co.
Grand Rapids, Mich.

Shells: Hot or Cold

Your article, "Shell Forming: Some Like It Hot, Some Like It Cold" (Feb. 27, page 128), is interesting. We would appreciate three copies. These will be utilized for the education of engineers who periodically require this type information due to our position in the ordnance procurement program.

R. O. Wildhagen
Small Business Specialist
St. Louis Ordnance District, U. S. Army
St. Louis

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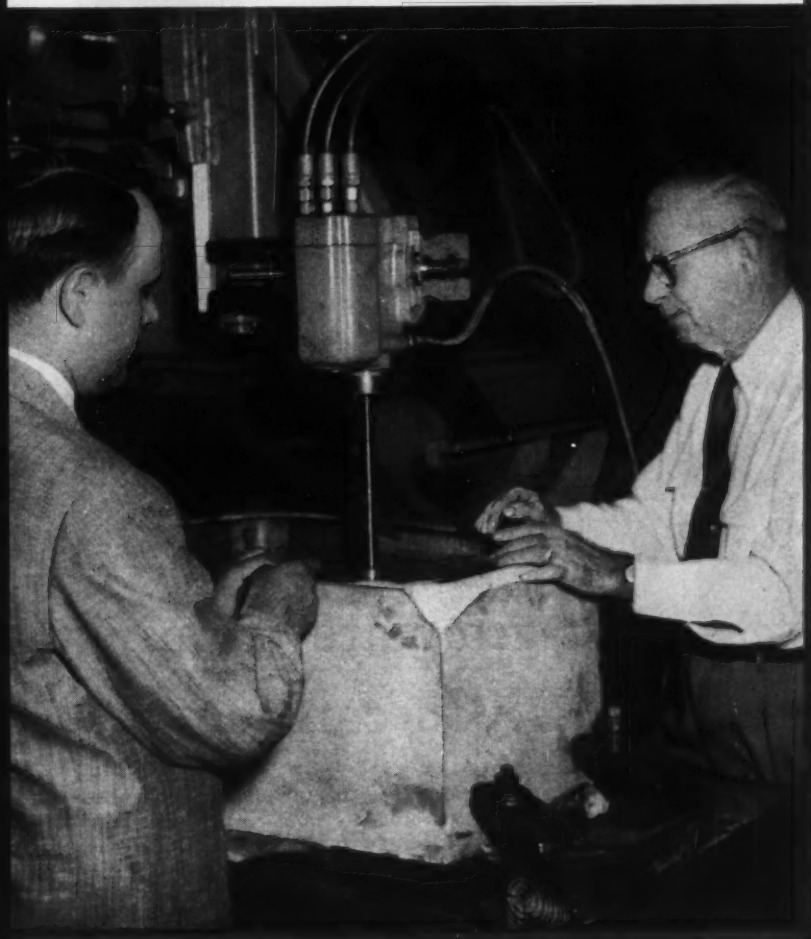
tough performer
in delicate operation



A. T. Wallace (right), President of Wallace Tool and Die Company, and Standard Oil lubrication specialist, H. A. Peterson, check sensitivity of new Cincinnati Hydro-Tel Milling Machine which uses STANOIL as hydraulic medium. Howard Peterson has been providing technical service to customers since joining Standard Oil. He is a graduate of General Motors Institute. Howard's customers find this experience pays off for them.

Delicate operations with metal requiring almost a surgeon's skill are every day stuff to Wallace Tool and Die Company, Indianapolis. Recently, they purchased a Cincinnati Hydro-Tel Milling Machine for their highest precision work. They selected STANOIL Industrial Oil for the hydraulic medium. The reason for choosing STANOIL: they wanted a hydraulic fluid that could deliver high performance. They wanted a clean hydraulic system, free of deposits that might clog filters and interrupt operations. They wanted smooth operation without pump chatter and without foam. They got these with STANOIL.

How did Wallace Tool and Die come to choose STANOIL? The answer is not hard to find. They had used STANOIL for hydraulic systems throughout their plant for many years. It has given them the results they wanted so it was natural to pick STANOIL for their new Cincinnati machine.

With STANOIL the machine performs the delicate operation of contour tracing with only 3½ ounces of pressure needed to control the milling cutters. STANOIL gives them smooth, steady, uninterrupted performance.

STANOIL can serve you. In the Midwest a lubrication specialist at your nearby Standard Oil office will be glad to show you. Call him. Or contact Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.

STANDARD

STANDARD OIL COMPANY (Indiana)

Veteran Chief takes post-graduate training at Ansul fire school...you can too

Throughout his entire career, Floyd Dumas has practiced what he preached . . . *you can't have too much fire training.* So it was logical that this veteran of 29 years' experience should attend Ansul's Fire Training School. As Chief of Fire Prevention for Parke Davis & Co., one of the nation's leading manufacturers of pharmaceuticals, his responsibilities are tremendous. The information Floyd took home from the Ansul School was passed on to each member of his staff who will be better firefighters for it.

You too can have this training. Ansul is the nation's pioneer in the field of fire training, and the only manufacturer to offer this important service to its customers. It is just one of many "extra" services made available to all Ansul users. And there is no charge whatsoever. Since 1940 this unique school has graduated over 2,800 students from all over this hemisphere, parts of Europe, Asia, and the Middle East.

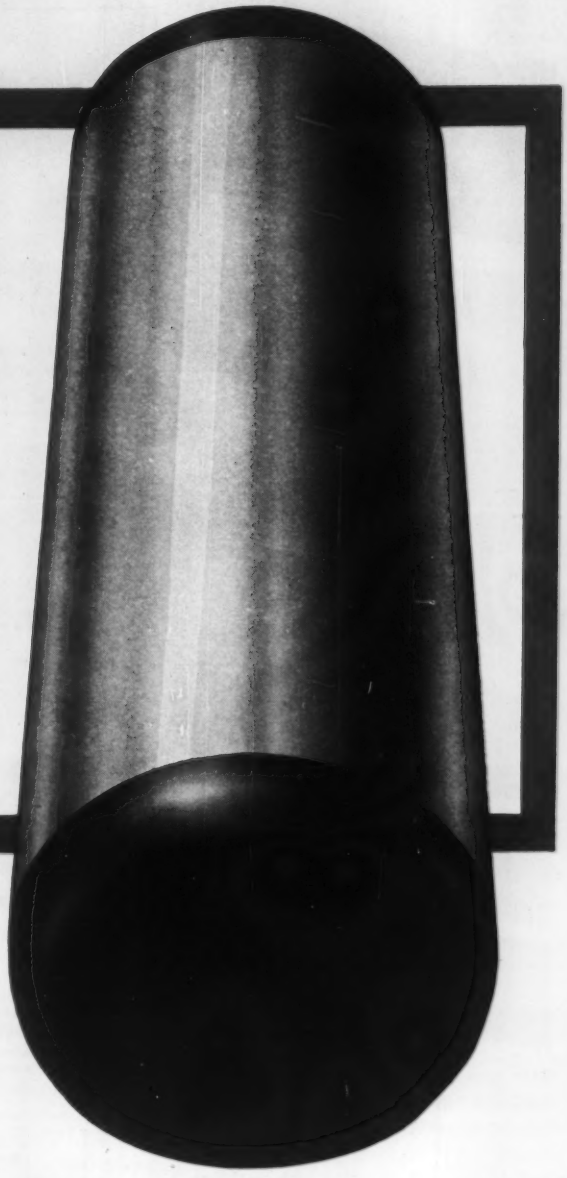
Training at the Ansul Fire School is of the practical kind. The classroom is Ansul's five-acre test field containing all the latest equipment, and staffed by expert instructors. You owe it to your business, to your position, to learn more about the Ansul Fire Training School.

Get in touch with your local ANSUL MAN through the yellow pages of your phone directory, or write to THE ANSUL CHEMICAL COMPANY, DEPT. S-4, MARINETTE, WISCONSIN.

ANSUL

"STOCK ANSWER"
to many a design problem

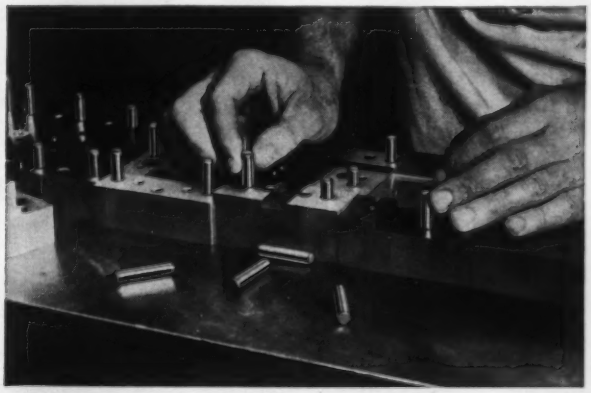
ALLEN DOWEL PINS



ALLEN DOWEL PINS are being profitably employed in a thousand and one ingenious ways beyond their conventional applications in tool and die work — as economical roller bearings, as axles, precision plugs, hinges and wrist pins to name a few.

If you have an application that will utilize the great strength, accuracy and fine finish of Allen Dowel Pins, you can save substantially on the cost of your product — because you can secure them at favorable prices right from your Allen Distributor's stock.

Check the quick facts at the right and write directly to Allen's Engineering Department for further technical information.



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- Made from Allenoy heat treated steel. Surface hardness 62-64, Rockwell C scale; core hardness 52-54. Case depth .010″ to .020″ depending on size.
- Single shear strength 160,000 to 180,000 p.s.i.
- Surfaces precision ground to ± .0001″ with micro-inch finish of 6 RMS max.
- Sizes: Diameters, ⅛″ to 1″. Lengths, ⅜″ to 6″.
- Two standard oversizes — .0002 for press fits between mating parts, or .001 for repair work, or holes machined oversize.

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Above, refueling the Viscount at Cleveland Hopkins Airport. At left, a stainless steel filler neck is welded to stainless steel section of the tank at Wilco, Inc., Kenton, Ohio and Shelbyville, Tennessee. There's no weakness here. The welded seams will last as long as the walls themselves.

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A unique tank truck, used in refueling Capital Airlines' new Viscount—the world's first turbo-prop airliner—has been developed by Shell Oil Company and built by Wilco, Inc.

The tank consists of two separate compartments. One containing Shell Fuel is fabricated from Republic 50 High Strength Steel for lightness and strength. The other is fabricated from Republic ENDURO Stainless Steel, Type 302, to resist the corrosive effect of the alcohol-water mixture. The two compartments are then welded together into one strong, integral unit.

ENDURO Stainless Steel has literally thousands of both ground and air applications. And it is economical to use because it does so many jobs so well at the lowest ultimate cost.

You can use ENDURO in thinner, lighter sections to save weight or gain space without loss of strength, without sacrifice of safety. ENDURO's exceptionally high strength-to-weight ratio and fatigue-resistance provide these bonus benefits.

ENDURO has proved its ability to resist heat in countless applications including compressors, turbines, after-burners, fire-walls and shrouding. Now it is replacing other metals that cannot retain their strength at the high temperatures produced by air friction at supersonic speeds.

Republic is the world's largest producer of aircraft steels—stainless steel, alloy steel and titanium. Our metallurgists and engineers are ready to help you apply them to your design or development work. Just send the coupon for more information.

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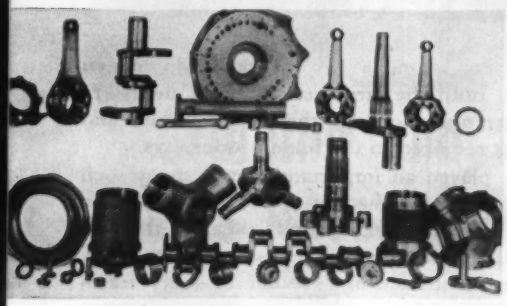
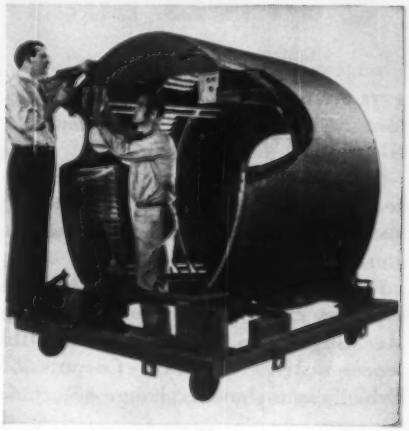


ALLOY STEELS are exceptionally strong. Their high strength-to-weight ratio permits smaller sections to carry heavier loads at higher speeds with no sacrifice in strength or safety. These fine steels lengthen service life in all types of parts and equipment. Republic metallurgists will help you use these steels to the best advantage.



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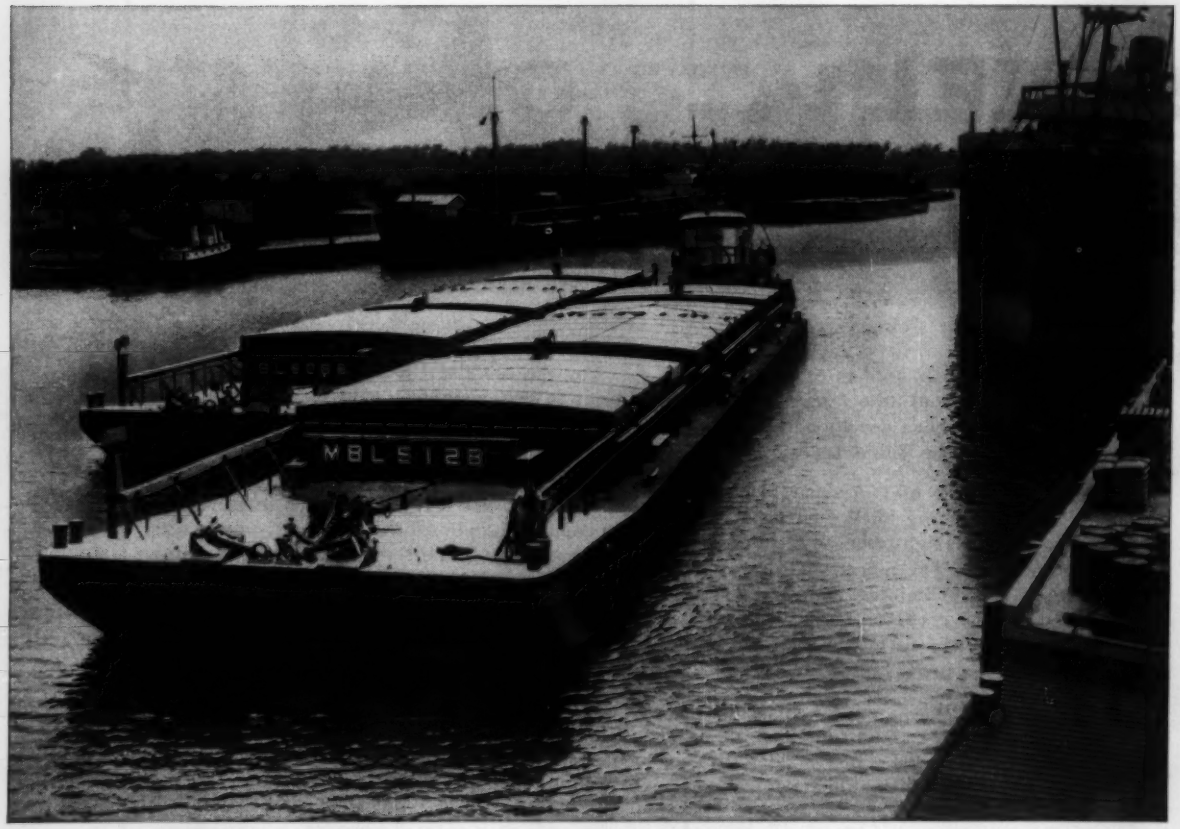


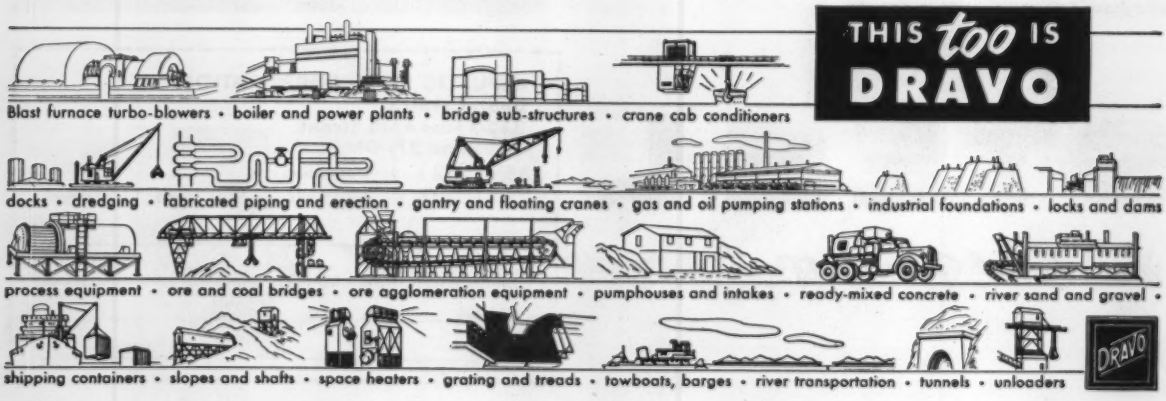
BARGES BOOST FLORIDA-MIDWEST COMMERCE

Twelve new barges now in operation on U. S. waterways are providing through service shipment of low-cost bulk commodities between Florida and the Midwest.

Formerly the high cost of transferring cargo from deep water vessels to river barges, as well as time lost in warehousing, made all-water transportation non-competitive.

Recognizing the future in this business if such expenses could be eliminated, officials of the A. L. Mechling Barge Lines, Inc., Joliet, Illinois, met with representatives of Dravo Corporation. In "Round Table" discussions, exchange of technical and operating information led to a new barge design which incorporated both the structural strength necessary in deep water operation and the low resistance and shallow draft required in the inland waterways.

Dravo has played an important part in many such projects aimed at furthering water transportation progress. This is another example of more than 60 years of service to business and industry in many fields, with customer satisfaction essential in every transaction. For more information write DRAVO CORPORATION, PITTSBURGH 25, PENNA.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BEHR-MANNING ABRASIVE BELTS team with the new Production Machine Co. #486 Centerless Grinder to produce fast, precision finishes on light round stock. For example, the operator (above) feeds small hardened steel pins at the rate of 20 fpm into the gravity chute. The end result is a continuous flow of finished pieces measuring .375" to .3752" in diameter, with a concentricity of .00015" and a finish of 4-10 rms.

This is another case of proven, modern methods combining with up-to-date Behr-Manning coated abrasive belt applications to provide industry with superior finishes at record-breaking speeds.

Your finishing operations might require an entirely different abrasive belt application. If so, check with your nearest BEHR-MANNING Demonstration Room for the latest time-saving method. Call your local Behr-Manning Representative, or write direct to Behr-Manning, Troy, N. Y., Dept. S-4.

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G-4

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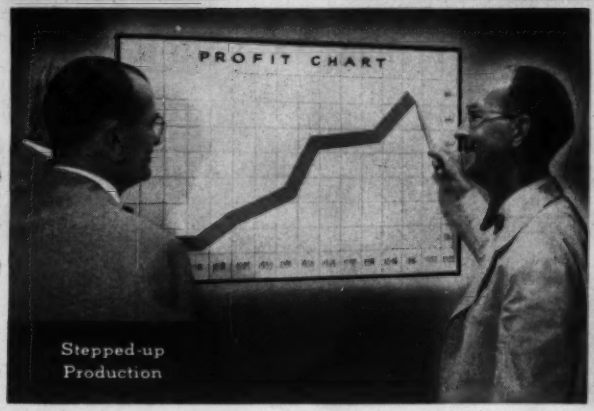
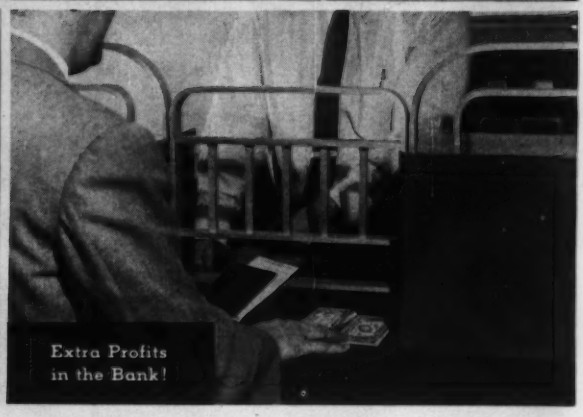




Cool Profits...when ANTISEP works for you!

Cooler, faster, cleaner cutting . . . longer tool life and less rejects . . . these are the things that make machine tools pay off in extra profits.

With *Antisep* All-Purpose Base on the job, you start collecting dividends right away—

. . . **it's inexpensive.** Because Antisep Base is cut 25 to 1, or more, with water, it costs less than 8c a gallon in the machine.

. . . **tools last longer.** Antisep's tough film and speedy water cooling keep tools and work cooler than any straight cutting oil could. Cases on record show tool life increased 12 times and more!

. . . **production increases.** Antisep Base's high lubricity withstands pressure and reduces friction. Machines can be run faster—rejects are reduced.

Put Antisep Base to the test on the toughest jobs in your plant. Check the results yourself and increase the profits from your machining operations. Call your Houghton Man today or write direct to E. F. Houghton & Co., 303 West Lehigh Avenue, Philadelphia 33, Pa.

ANTISEP all-purpose cutting base

. . . a product of

E. F. HOUGHTON & CO.

PHILADELPHIA • CHICAGO • DETROIT • SAN FRANCISCO

Ready to give you on-the-job service . . .

CALENDAR
OF MEETINGS

Apr. 4-6, American Institute of Steel Construction Inc.: Spring meeting and national engineering conference. Lehigh University, Bethlehem, Pa. Institute's address: 101 Park Ave., New York 17, N. Y. Secretary: M. Harvey Smedley.

Apr. 4-6, American Society of Lubrication Engineers: Annual meeting and exhibit, William Penn hotel, Pittsburgh. Society's address: 84 E. Randolph St., Chicago 1, Ill. Administrative secretary: William P. Youngclaus Jr.

Apr. 4-6, Rail Steel Bar Association: Annual meeting, Boca Raton hotel and club, Boca Raton, Fla. Association's address: 38 S. Dearborn St., Chicago 3, Ill. Secretary: W. H. Jacobs.

Apr. 4-7, National Screw Machine Products Association: Annual meeting, Schroeder hotel, Milwaukee. Association's address: 2860 E. 130th St., Cleveland 20, O. Executive vice president: Orrin B. Wernts.

Apr. 8, Packaging Machinery Manufacturers Institute: Spring meeting, Dennis hotel, Atlantic City, N. J. Institute's address: 342 Madison Ave., New York 17, N. Y. Executive director: R. L. Sears.

Apr. 8-12, Scientific Apparatus Makers Association: Annual meeting, Belleview-Biltmore hotel, Belleair, Fla. Association's address: 20 N. Wacker Dr., Chicago 6, Ill. Executive vice president: Kenneth Andersen.

Apr. 9-11, American Institute of Mining & Metallurgical Engineers: Meeting of National Open-Hearth, National Blast Furnace, Coke Oven and Raw Material Committees, Netherland Plaza hotel, Cincinnati. Institute's address: 29 W. 39th St., New York 18, N. Y. Secretary: E. O. Kirkendall.

Apr. 9-12, American Management Association: Packaging conference, Convention Hall, Atlantic City, N. J. Association's address: 1515 Broadway, New York 36, N. Y. Vice president-secretary: James O. Rice.

Apr. 9-12, Society of Automotive Engineers Inc.: National aeronautic meeting, aeronautic production forum and aircraft engineering display, Hotel Statler, New York. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: John A. C. Warner.

Apr. 10-11, American Society of Mechanical Engineers: Machine design conference, Bancroft hotel, Worcester, Mass. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: C. E. Davies.

Apr. 10-12, Metal Powder Association: Annual meeting and show, Hotel Cleveland, Cleveland. Association's address: 420 Lexington Ave., New York 17, N. Y. Secretary: Robert L. Ziegfeld.

Apr. 12-17, National Association of Architectural Metal Manufacturers: Annual meeting, Belleview-Biltmore hotel, Belleair, Fla. Association's address: 228 N. LaSalle St., Chicago 1, Ill. Executive secretary: William N. Wilson.

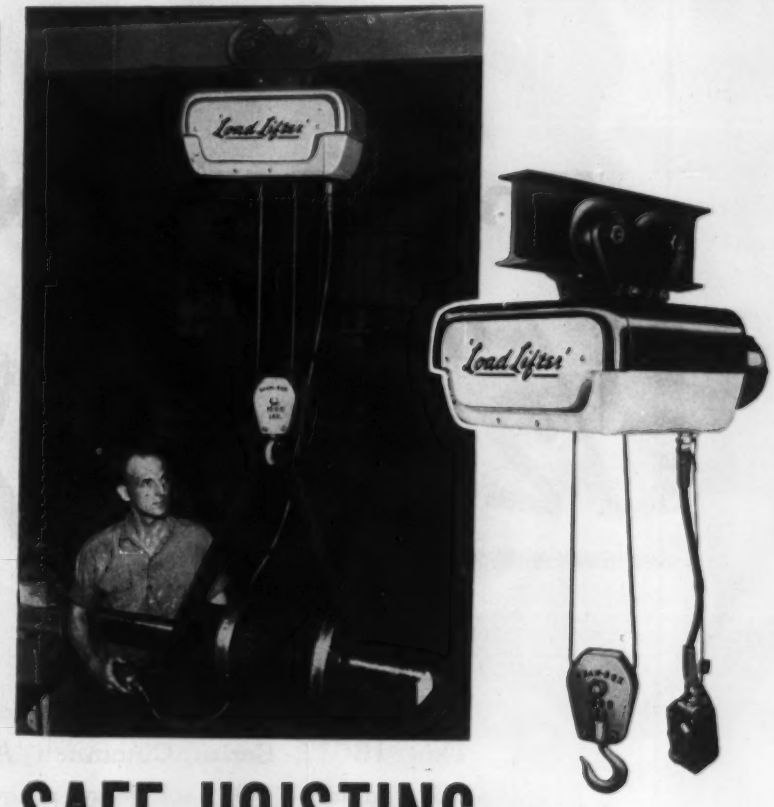
Apr. 15-19, American Hardware Manufacturers' Association: Spring convention, Roosevelt hotel, New Orleans. Association's address: 342 Madison Ave., New York 17, N. Y Secretary-treasurer: Arthur Faubel.

Apr. 16-17, American Society of Mechanical Engineers: Gas turbine power conference, Hotel Statler, Washington. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: C. E. Davies.

Apr. 18-19, Bituminous Coal Research Inc.: Annual meeting, Deshler Hilton hotel, Columbus, O. Association's address: 804 Southern Bldg., Washington, D. C. Secretary: C. A. Reed.

Apr. 18-19, Armour Research Foundation of Illinois Institute of Technology: National industrial research conference, Sherman hotel, Chicago. Foundation's address: 10 W. 35th St., Chicago 16, Ill.

Apr. 19-21, Gas Appliance Manufacturers Association: Annual meeting, Greenbrier, White Sulphur Springs, W. Va. Association's address 60 E. 42nd St., New York 17, N. Y. Secretary: Harold Massey.



SAFE HOISTING
THAT PAYS OFF IN SAVINGS

Safe hoisting demands more than devices to protect man, load and hoist. Equally vital are *invisible values:* experienced engineering, careful selection of materials, precision manufacture and thorough tests.

The Series "600" 'Load Lifter' Electric Hoist has *two* powerful, automatic brakes. Each alone can hold the full load. Modern 'Load Lifter' Hoists were first to have safe 24 volts at the push buttons. Steel suspension, tough wire rope and non-fracturing load hook provide extra strength for heavy-duty service. All operating parts are enclosed, but the hoist can be serviced safely *in the air.*

Safety . . . quality . . . performance — the Series "600" 'Load Lifter' Electric Hoist is "okay on every count." It is fast — lifts 1000 lbs. at 30 FPM. Sizes: ½ and 1-ton. All types of suspension, including motorized trolley. *Call your "Shaw-Box" Distributor or ask us for Bulletin 408.*

'Load Lifter'® ELECTRIC HOISTS

MANNING MAXWELL & MOORE INC. TRADE MARK

MANNING, MAXWELL & MOORE, INC.

MUSKEGON, MICHIGAN

Builders of "SHAW-BOX" and 'LOAD LIFTER' Cranes, 'BUDGIT' and 'LOAD LIFTER' Hoists and other lifting specialties. Makers of 'ASHCROFT' Gauges, 'HANCOCK' Valves, 'CONSOLIDATED' Safety and Relief Valves, 'AMERICAN' and 'AMERICAN-MICROSEN' Industrial Instruments, and Aircraft Products.

This CINCINNATI...

1½" thick x 12'

This 15012 Series Cincinnati All-Steel Shear has a 36" gap and a 48" back gauge range.

Power for heavy cutting with accuracy and operating convenience are combined in this machine.

Modern features such as—Hydraulic Holddowns, Front Operated Power Back Gauge, Hinged Back Gauge Angle, Automatic Pressure Lubrication, All-Steel Interlocked Construction, Forged Alloy Steel Eccentric Shaft—all contribute to an outstanding performance with low maintenance and high accuracy.

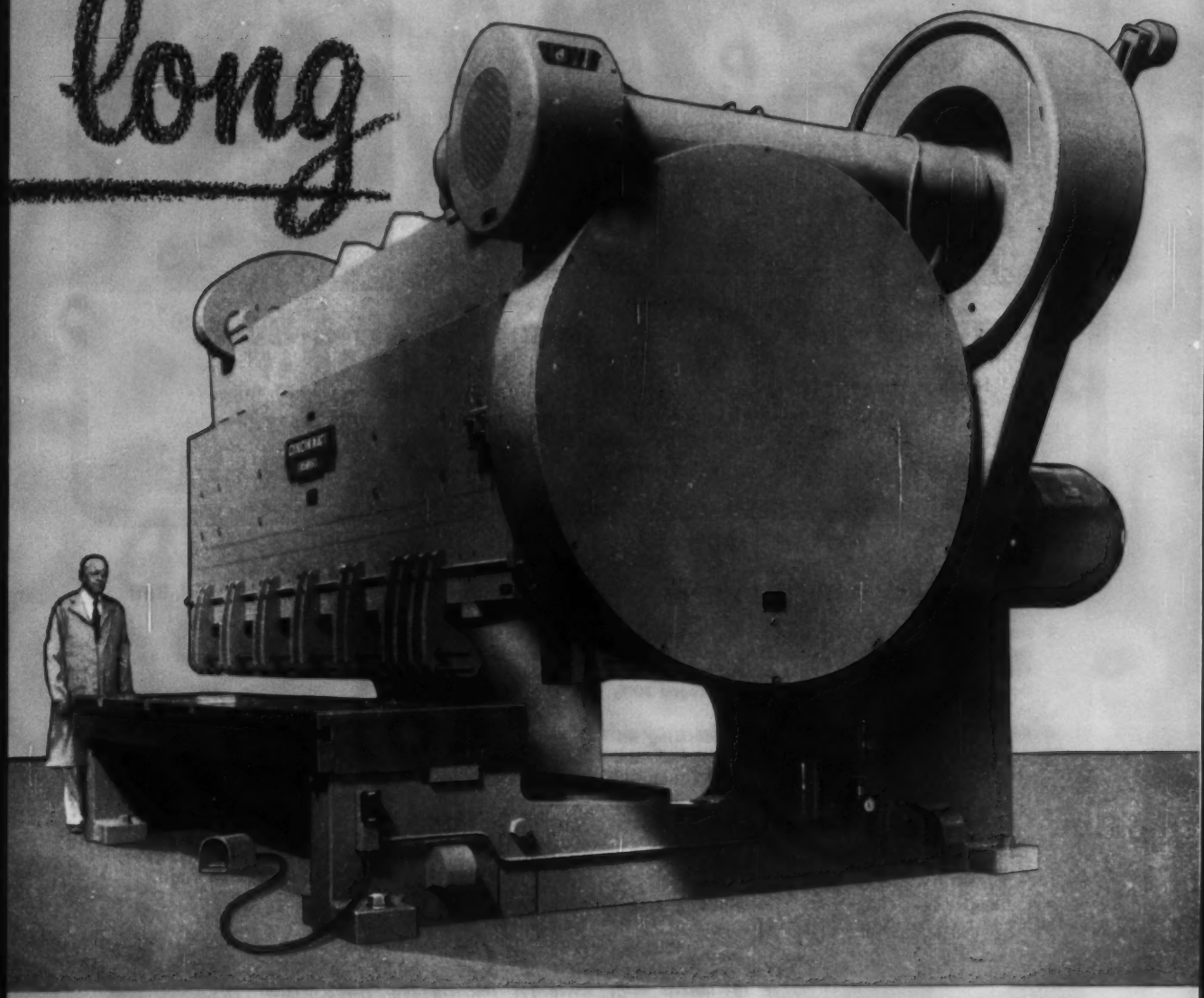
Write for Catalog S-7.

THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO, U.S.A. SHAPERS • SHEARS • BRAKES

shears steel plate

long



See your Cincinnati Representative for either Heavy or Light Shearing Applications.

This is a plain Ruff-L-Buff after wearing off about one inch in testing operations and then trimming. Loose threads, broken material and numerous small holes due to excessive heat and abrasion of the cloth are apparent.

30% LONGER BUFF LIFE

The Binderized Ruff-L-Buff shown here was subjected to the identical test undergone by the untreated buff — yet look at the difference! Notice the absence of thread or cloth breakage of any kind, proof of Binderizing's effect on buff life.

with H-VW-M Binderized* Ruff-L-Buffs®

Not just "another type of buff," but a revolutionary H-VW-M process which impregnates the entire Ruff-L-Buff with the same organic binder used in buffing compounds. From these "Binderized" Ruff-L-Buffs come a host of practical, cost-cutting advantages, proved over many months in actual production line operations.

Item by item, these are the six major advantages of the H-VW-M Binderized Ruff-L-Buff.

- **Longer buff life** – damage from overheating eliminated by pre-lubrication of buffing material, preventing excess frictional heat caused by constant flexing. This additional buff life has averaged 30% in actual test runs.
- **Better compound adherence** – the binderizing impregnation creates an affinity between buff and compound. The compound does the cutting, not the buff.
- **Faster cutting action** – more compound is retained on the buff, insuring an even cut for a longer period without re-application of compound.
- **Extended composition life** – additional binder in the cloth ensures better abrasive adhesion, longer life of both composition and buff.
- **Heading-up time** – new wheels require only application of the compound to be ready for immediate operation.
- **Cooler running** – in addition to pre-lubrication, six holes in the center and twelve air channels in the center rim provide a forced air circulation over all cloth surfaces.**

And, of course, Binderized Ruff-L-Buff retain such important features as *bias-cut cloth* to prevent unravelling, *perfect buff balance* for uniform rotation and wear, and *exclusive Red-E-To-Use face* that takes compound without need for surface preparation.

H-VW-M bias-cut Sisalweev buffing wheels are also available in Binderized types.

* Patent Pending
** Patent No. 2,140,208

For complete information on H-VW-M Binderized Ruff-L-Buffs and other specialized buffs write for Bulletin No. B-102.

PLATEMANSHIP

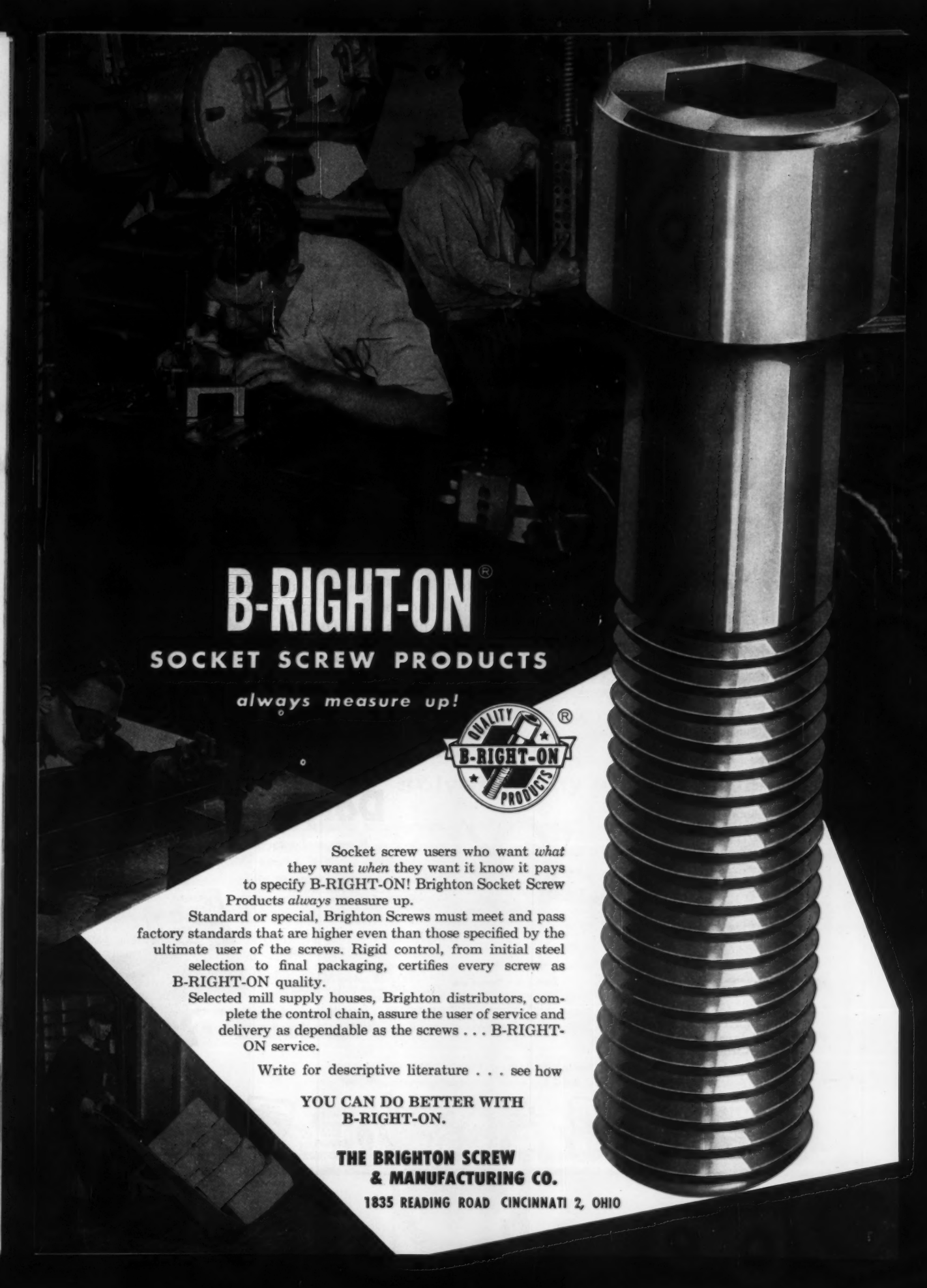
Your H-VW-M combination—of the most modern testing and development laboratory—of over 80 years experience in every phase of plating and polishing — of a complete equipment, process and supply line for every need.

HANSON-VAN WINKLE-MUNNING COMPANY, MATAWAN, N. J.
Plants: Matawan, N. J. • Grand Rapids, Mich.
SALES OFFICES: Anderson (Ind.) • Baltimore • Beloit (Wisc.) • Boston Bridgeport • Chicago • Cleveland • Dayton • Detroit • Grand Rapids • Los Angeles • Louisville • Matawan • Milwaukee New York • Philadelphia • Pittsburgh • Plainfield • Rochester St. Louis • San Francisco • Springfield (Mass.) • Utica Wallingford (Conn.)

H-VW-M

1233A

INDUSTRY'S WORKSHOP FOR THE FINEST IN PLATING AND POLISHING PROCESSES • EQUIPMENT • SUPPLIES



B-RIGHT-ON®

SOCKET SCREW PRODUCTS

always measure up!

QUALITY B-RIGHT-ON® PRODUCTS

Socket screw users who want *what* they want *when* they want it know it pays to specify B-RIGHT-ON! Brighton Socket Screw Products *always* measure up.

Standard or special, Brighton Screws must meet and pass factory standards that are higher even than those specified by the ultimate user of the screws. Rigid control, from initial steel selection to final packaging, certifies every screw as B-RIGHT-ON quality.

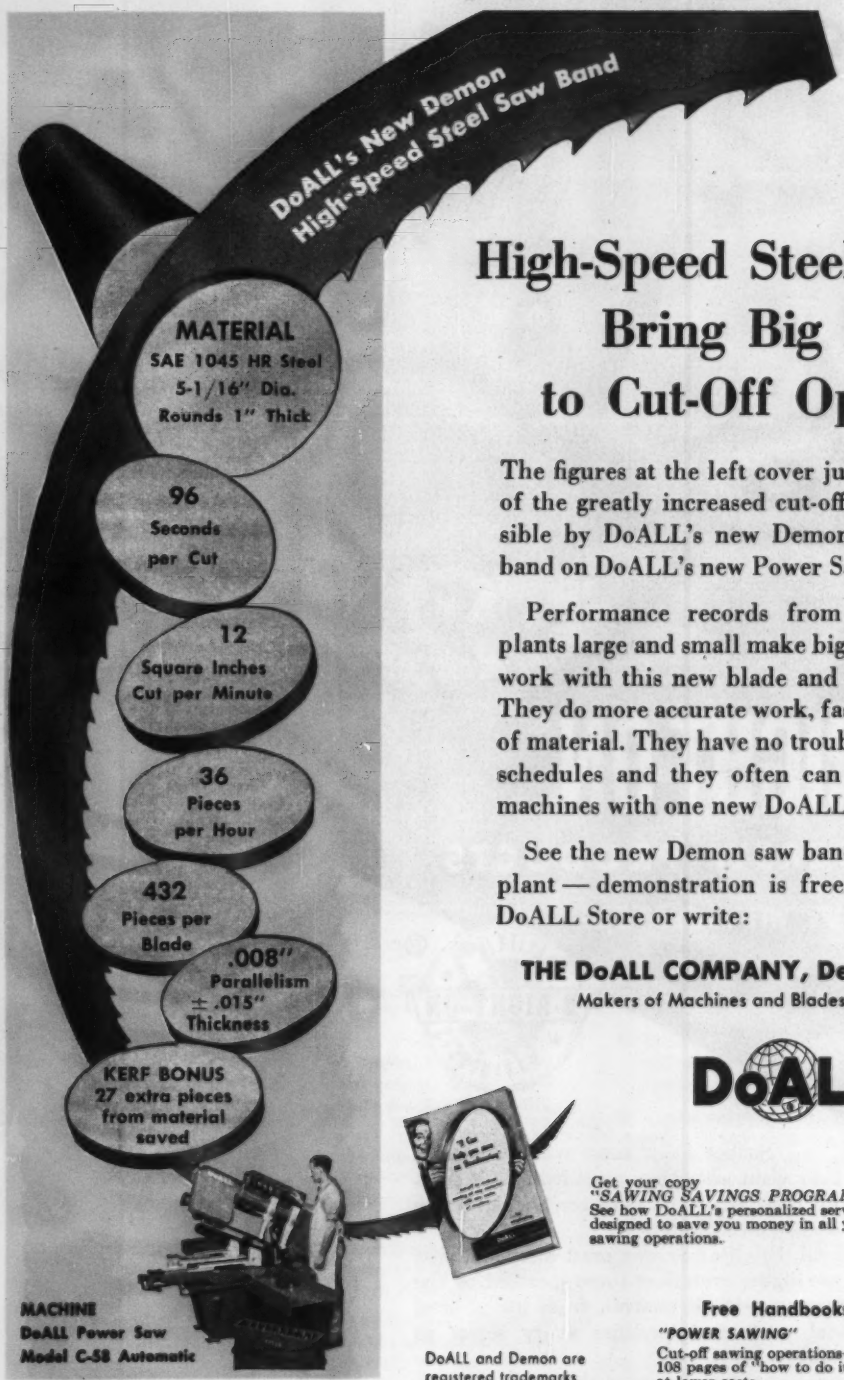
Selected mill supply houses, Brighton distributors, complete the control chain, assure the user of service and delivery as dependable as the screws . . . B-RIGHT-ON service.

Write for descriptive literature . . . see how

YOU CAN DO BETTER WITH B-RIGHT-ON.

THE BRIGHTON SCREW & MANUFACTURING CO.

1835 READING ROAD CINCINNATI 2, OHIO



High-Speed Steel Saw Bands Bring Big Profits to Cut-Off Operations!

The figures at the left cover just one typical example of the greatly increased cut-off efficiencies made possible by DoALL's new Demon *high-speed steel* saw band on DoALL's new Power Saw.

Performance records from industry prove that plants large and small make big profits on their cut-off work with this new blade and machine combination. They do more accurate work, faster and with less waste of material. They have no trouble meeting production schedules and they often can replace two or three machines with one new DoALL unit.

See the new Demon saw band in operation at your plant — demonstration is free. Just call your local DoALL Store or write:

THE DoALL COMPANY, Des Plaines, Illinois

Makers of Machines and Blades—they go together!

DoALL

Get your copy
"SAWING SAVINGS PROGRAM"
See how DoALL's personalized service is designed to save you money in all your sawing operations.

Free Handbooks

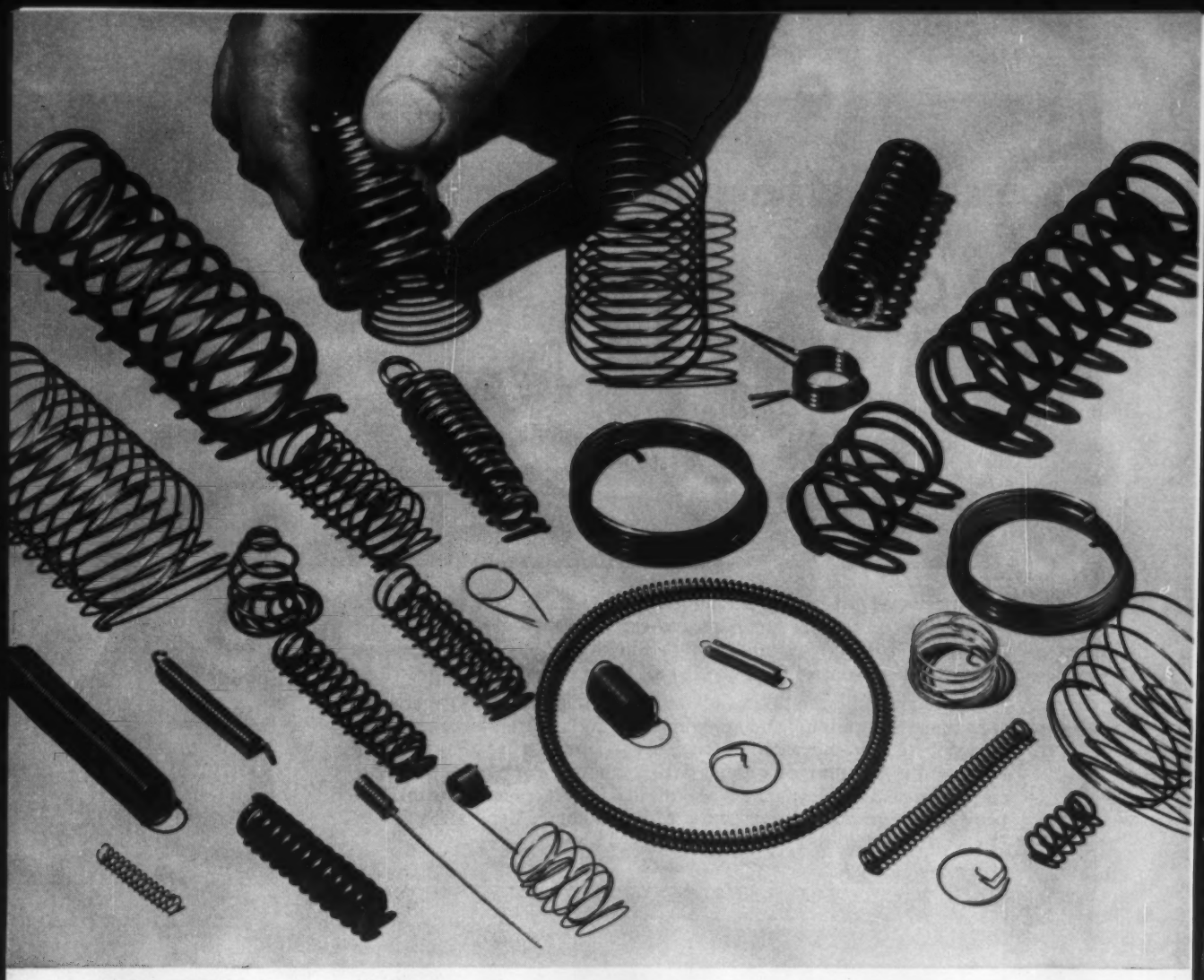
"POWER SAWING"
Cut-off sawing operations—108 pages of "how to do it" at lower costs.

"BAND TOOL MANUAL"
160 pages of saw selection—cutting rates for materials.

DoALL and Demon are registered trademarks of The DoALL Company

Friendly DoALL Stores (in 38 cities)
Personalized Service • Complete Stocks
Local Delivery

SB-40R



How the right "COAT" solves many spring problems

● Unless you yourself go in for forming wire springs, you have no idea what a tricky business it is. For one thing, as every fabricator knows, it takes extreme uniformity in the wire to obtain the precise dimensions and the exacting tension, torsion or compression characteristics so often required.

But uniformity alone won't always do the trick! As a leading supplier of special wire for tougher-than-usual spring requirements, National-Standard has delved deep into production problems and has come up with answers that help many a fabricator hold better to tough specifications and produce faster with less waste and more profit!

Time and again, for example, National-Standard has shown that merely a change in wire *coating* or lubrication quality is of major importance in forming operations. Proper coating also helps gain uniform dimensional response to heat treating. Quite often, in fact, troubles chalked up to wire variance are really the fault of improper coating or finish.

Helping fabricators solve problems and cut costs is a National-Standard specialty. We're geared for it and make a point of it. Try us and see!

NATIONAL-STANDARD COMPANY • NILES, MICHIGAN
Tire Wire, Stainless, Fabricated Braids and Tape

ATHENIA STEEL DIVISION • CLIFTON, N. J.
Flat, High Carbon, Cold Rolled Spring Steel

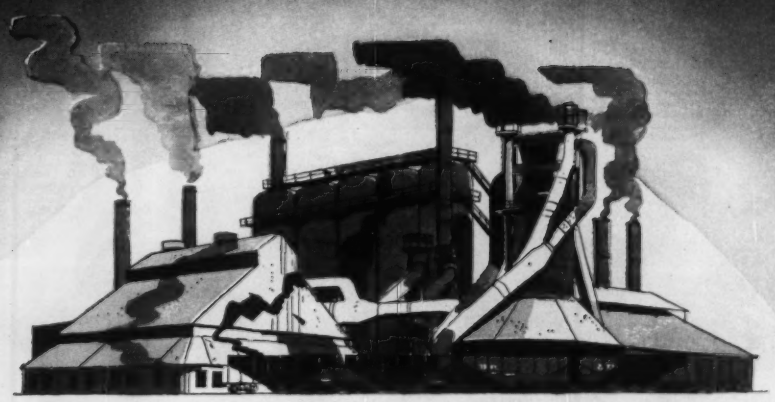
REYNOLDS WIRE DIVISION • DIXON, ILLINOIS
Industrial Wire Cloth

NS
NATIONAL-STANDARD Company
NILES, MICHIGAN

WAGNER LITHO MACHINERY • JERSEY CITY, N. J.
Special Machinery for Metal Decorating

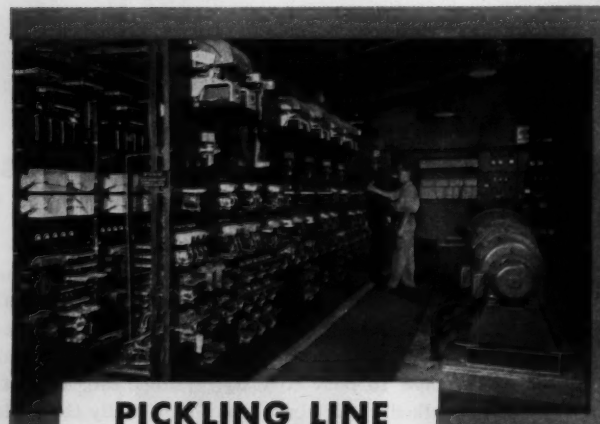
WORCESTER WIRE WORKS DIVISION • WORCESTER, MASS.
Round and Shaped Steel Wire, Small Sizes

expanding mill standardizes on



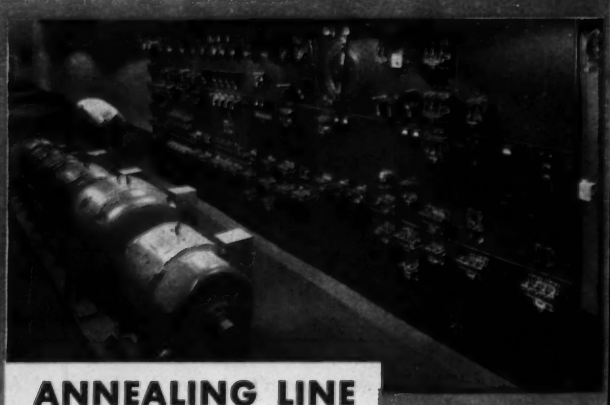
To meet ever-increasing demands for specialized steel, an eastern mill has completed an extensive expansion program consisting of a new reversing cold mill and two auxiliary lines. Significantly, Allis-Chalmers control is utilized in all three operations.

Progressive mills are taking advantage of Allis-Chalmers experience in engineering, building and applying steel mill control — control that provides smooth, precision performance — control that affords maximum production and top quality with a minimum of outage time and maintenance. Get all the facts about Allis-Chalmers mill control. See your A-C representative or write Allis-Chalmers, General Products Division, Milwaukee 1, Wisconsin.



PICKLING LINE

The Allis-Chalmers control on this line provides an exceptionally wide speed range of more than 15 to 1. Power for the line comes from three separate m-g sets employing magnetic amplifiers for quick response. Complete synchronization between entry, processing and delivery sections permits continuous mill operation.



ANNEALING LINE

This control features power-type magnetic amplifier regulation for accurate control and low maintenance. Variable voltage power is obtained from a six-machine m-g set. Speed regulation of .5% assures constant strip speed and a resulting uniformity of high quality steel. Open-type control boards utilize Allis-Chalmers components especially designed for mill operation.

ALLIS-

STEEL

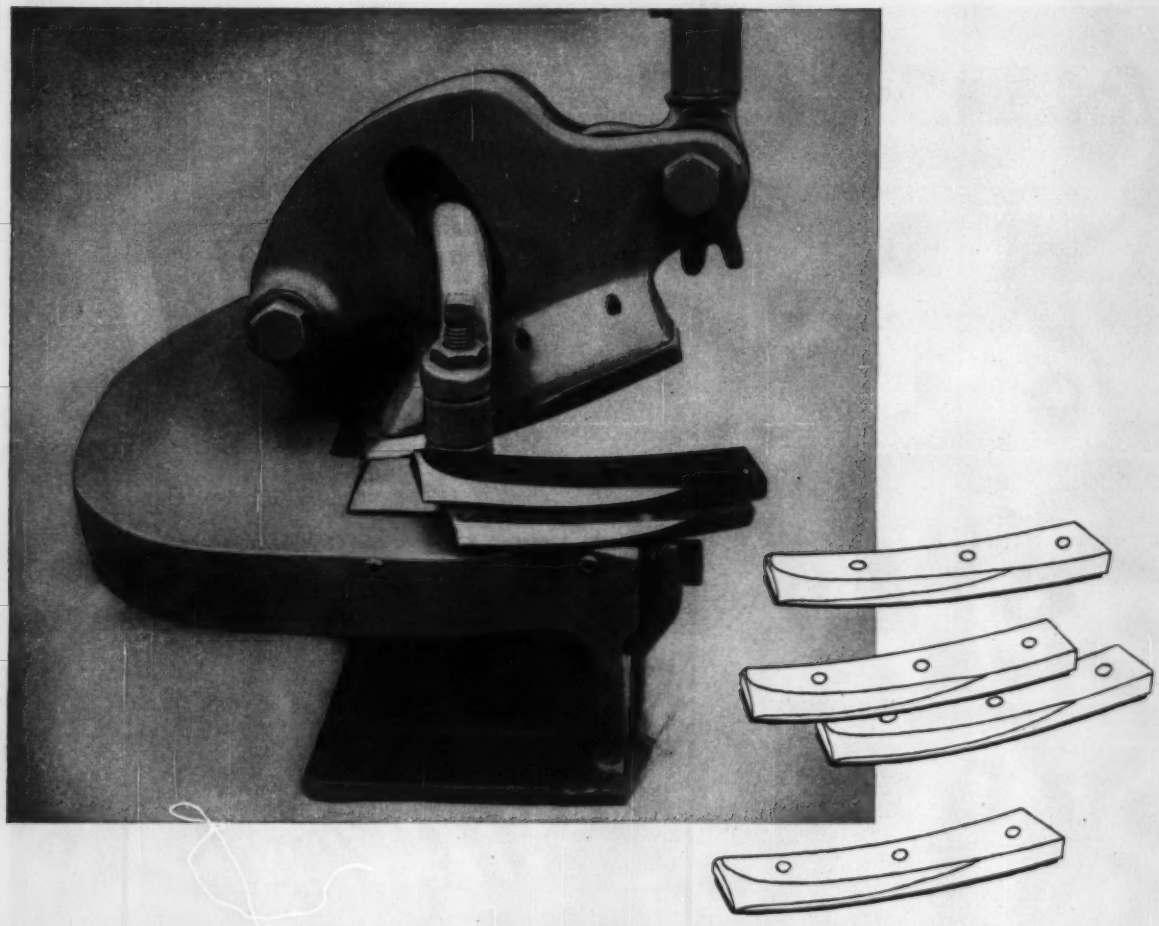
REVERSING MILL

Critical percentage reduction of specialized steels rolled with this mill requires exacting control. Main mill voltage and reel tension circuits utilize new high-gain magnetic amplifier control. Because the magnetic amplifier is a static device, maintenance and necessity of replacement parts are reduced to a minimum. Fast arc-centering blowout on the dc contactors, shown on the control board, extends contact and chute life. Exceptional interchangeability of contactor and relay parts affords maximum convenience and economy.

A-C ALLIS-CHALMERS

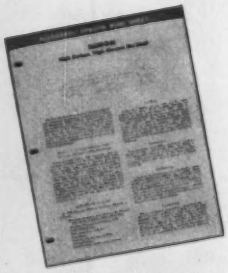
A-4971

CHALMERS



Shear Manufacturer ups blade life 4 to 5 times...

with A-L HURON DIE STEEL



Write for Your
HURON BLUE SHEET

A compilation of facts on the handling and shop treatment of Huron. Includes complete information on forging, annealing, tempering, etc. and detailed laboratory data on physical characteristics. *Ask for your free copy.*

Address Dept. S-76

A Chicago bench shear manufacturer produced some test blades of Ludlum HURON die steel—heat treated to 61-62 Rockwell C.

Service life of the HURON blades proved to be four to five times that of the former blades. Resharpenings were reduced 75 to 80%! Because these new HURON blades held an exact rake and maintained a proper cutting arc, they easily sheared 3/16" mild steel or 10 gauge stainless.

Ludlum Huron was developed for use where high resistance to wear and abrasion is necessary, and where heavy pressure rather than sudden shock must be withstood. Huron has excellent non-deforming properties, and hardens to a great depth.

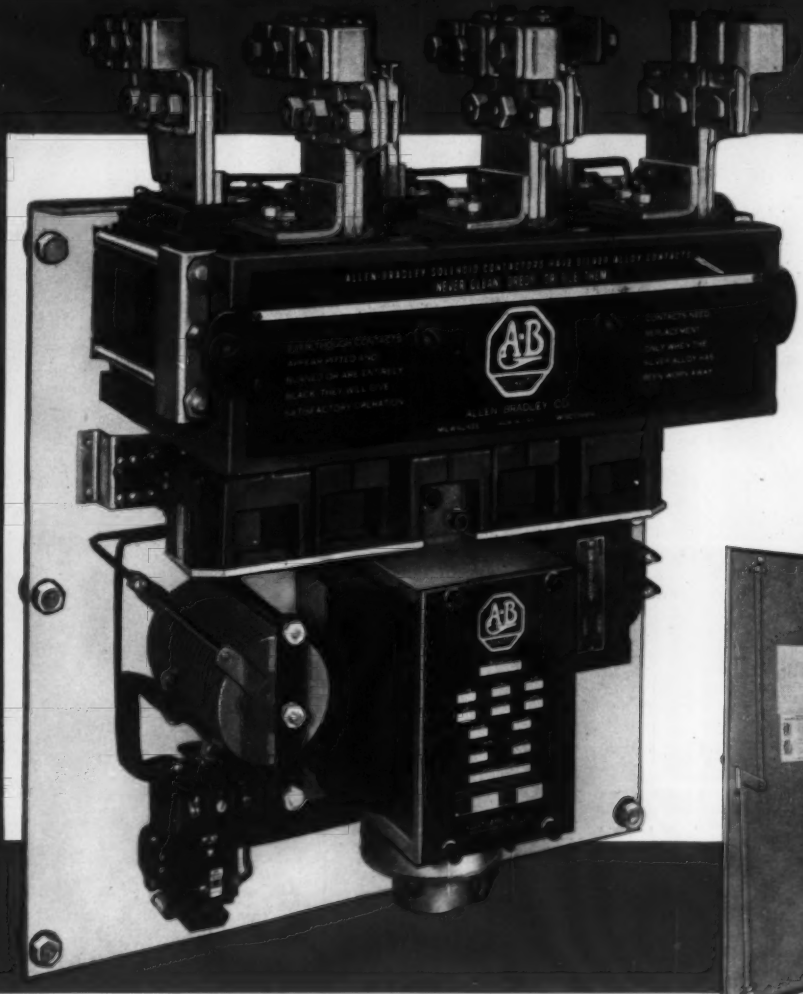
There is an A-L tool steel that will help solve your cutting, forming or blanking problem. Call our nearest office or distributor today, or write *Allegheny Ludlum Steel Corporation, Oliver Building, Pittsburgh 22, Pennsylvania.*

For complete MODERN Tooling, call

Allegheny Ludlum

WAD 9329

AL® FINE TOOL STEELS SINCE 1854

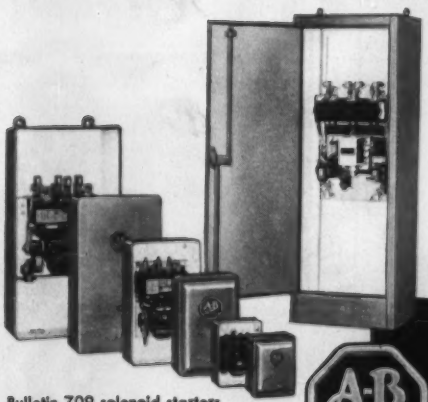


Left—Allen-Bradley Size 7 solenoid contactor used in large solenoid starters.

Below—Allen-Bradley Size 7 solenoid starter with overload relays in NEMA Type 1 general purpose, floor mounted enclosure.

ALLEN-BRADLEY SOLENOID STARTERS USE DOUBLE BREAK, SILVER ALLOY CONTACTS THROUGHOUT!

Eight Sizes up to 300 hp, 220 v; 600 hp, 440-550 v.



Bulletin 709 solenoid starters shown here in Sizes 0 to 6—all equipped with accurate and reliable overload relays.

All starter manufacturers use the solenoid construction and double break, silver alloy contacts for their lower starter ratings, because experience has proved this construction superior to any other. Therefore, wouldn't this experience repeat itself with the higher rated starters?

Allen-Bradley has found this to be absolutely true. Its starters of high hp rating are regularly establishing new standards of starter performance. As you go from size to size, the operating characteristics remain the same—you get trouble-free, long-life performance.

Standardize on Bulletin 709 solenoid starters—they are Tops in Quality!

Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wis.
In Canada—Allen-Bradley Canada Ltd., Galt, Ont.

3-56-MR

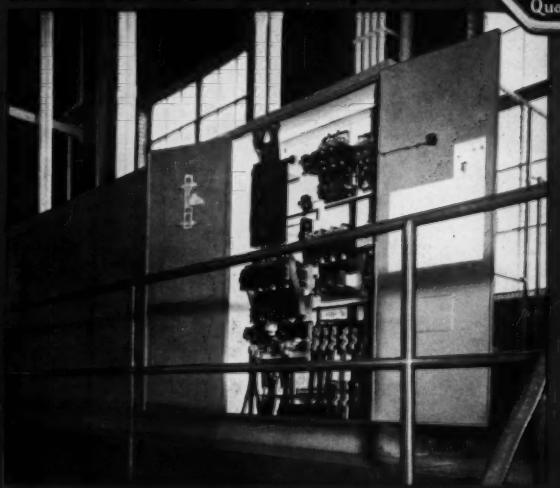
A-B Quality

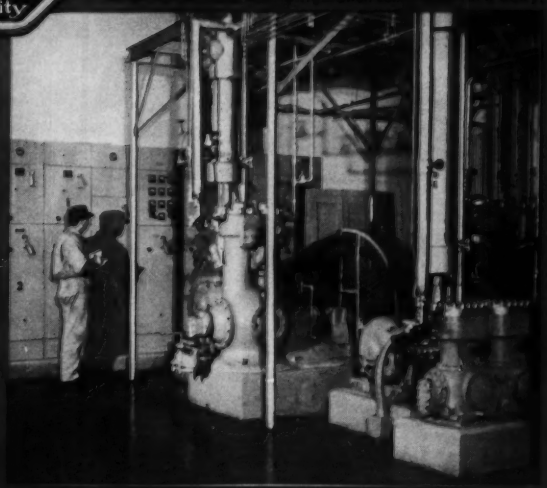
ALLEN-BRADLEY

SOLENOID STARTERS

QUALITY

A-B Quality



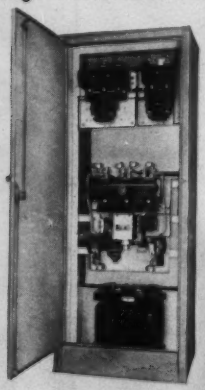


ALLEN-BRADLEY STARTERS FOR LARGE A-C MOTORS ARE AS POPULAR AS THE BULLETIN 709 SIZE 1 FOR SMALL MOTORS

Allen-Bradley manual and automatic starters for large squirrel-cage, slip-ring, and synchronous motors—both high and low voltage—have earned the same reputation for "Quality" for which the lower ratings are known. Every operating requirement can be satisfied, either with individual units or as sections of a multi-unit control center.

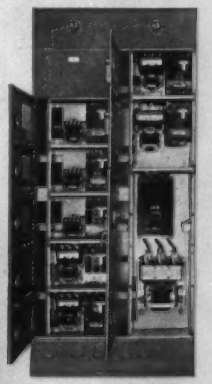
Allen-Bradley high voltage starters are rated up to 1500 hp with voltages ranging from 2000 to 4600 volts. The high voltage, synchronous motor starters are self-protecting against short circuits up to 250,000 kva on 2501-4600 volts, 3 phase, 60 cycles. Oil or air break switching available. Please write for the Handy Catalog.

Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wis.
In Canada—Allen-Bradley Canada Ltd., Galt, Ont.



A-B automatic autotransformer, reduced voltage starter with cabinet open to show control panel.

ALLEN-BRADLEY
SOLENOID STARTERS
QUALITY



A B multi unit control center with compartment doors open to show various types of motor controls.

3-56-MR

When steel is 3 times stronger than iron . . .

Has two and one-half times the rigidity . . .

Yet costs a third as much per pound . . .

WHY aren't more of your products designed for welded steel

FORMER CONSTRUCTION COSTS 85¢

WELDED STEEL DESIGN COSTS 65¢

A 23% reduction in cost . . . by a simple change in design. But that's not all. The welded steel design uses less material . . . but is stronger, more rugged.

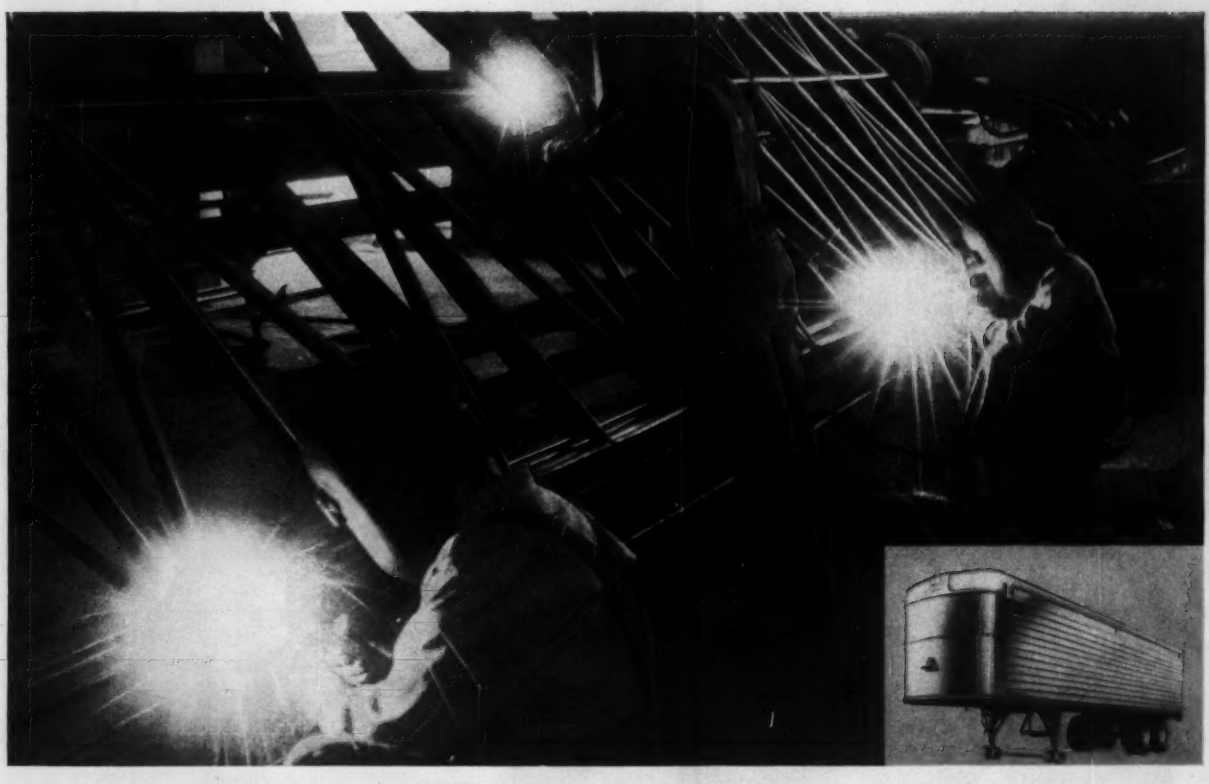
Let Lincoln duplicate these savings and benefits on your products. Write us today.

THE LINCOLN ELECTRIC COMPANY

Dept. 1615, Cleveland 17, Ohio

Creating lower costs for industry ...with welded steel

© 1956 The Lincoln Electric Company



The Champion is a feather-weight van built for heavy-duty service. For extra strength Airco welding rods, Easyarc 12 and Airco 387 electrodes are used *exclusively* to join the tough-but-light tubular steel frame. Faster, more economical production was also achieved through the use of Airco Heliwelding equipment, cutting torches and accessories.

4 Airco products help put new champion on the road —lighter by one thousand pounds!

The Dorsey Trailer Company, Elba, Alabama, wanted to cut the weight of its vans by a thousand pounds — without cutting durability or strength. An aluminum and tubular steel design solved the first part of the problem. The selection of Airco products for the all-important welding job neatly took care of the rest.

From planning to production you can rely on assistance — and completely unbiased recommendations — from Airco Technical men. For Airco is the leading supplier-manufacturer of all kinds and every type of welding and flame cutting processes, their controls, supplies and accessories. Write to Airco for free literature describing Heliwelding equipment and Airco electrodes.

WELDING SHOW — VISIT OUR BOOTH

AT THE FRONTIERS OF welding PROGRESS YOU'LL FIND . . .

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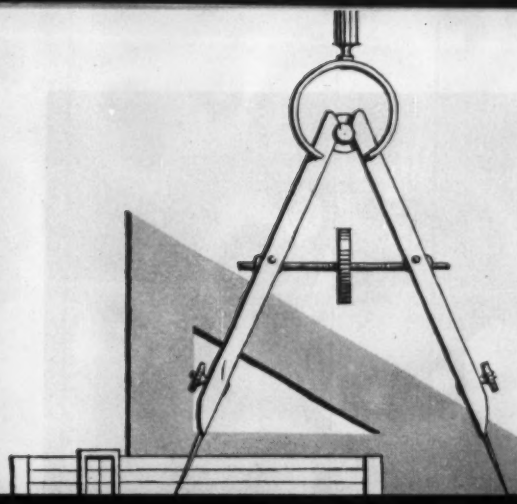
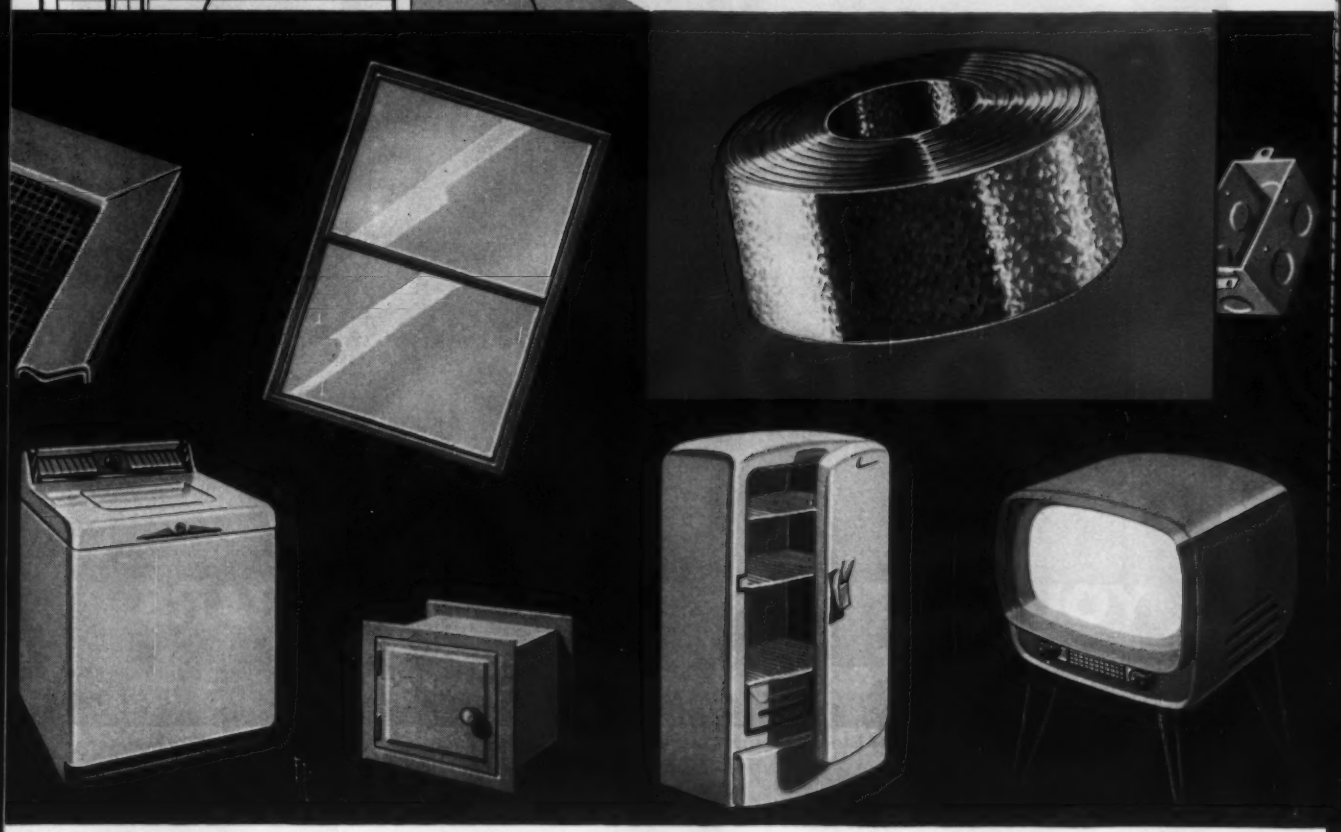
Products of the divisions of Air Reduction Company, Incorporated, include: AIRCO — industrial gases, welding and cutting equipment, and acetylenic chemicals • PUROX — carbon dioxide, liquid-solid ("DRY-ICE") • OHIO — medical gases and hospital equipment • NATIONAL CARBIDE — pipeline acetylene and calcium carbide • COLTON — polyvinyl acetates, alcohols, and other synthetic resins.



put these bonus advantages of WEIRKOTE galvanized steel to work for you!



For appliances, for other steel products . . . when the job calls for galvanized steel, Weirkote does that job *better.*

Weirkote is made by a special continuous galvanizing process . . . and a tight zinc coating is applied. Result: Weirkote is resistant to peeling, cracking and flaking, even under the severest stresses of fabrication. The coating stays uniform, flows evenly with the base metal, and holds fast under the deepest draws. Amazingly corrosion-resistant, too!

These are just a few of Weirkote's *bonuses* in durability, economy, customer satisfaction. Make it a point to investigate Weirkote from Weirton! Remember: *In the long run, galvanized steel . . . in the LONGER run, WEIRKOTE.*

WEIRTON STEEL COMPANY

WEIRTON, WEST VIRGINIA

a division of

NATIONAL STEEL CORPORATION

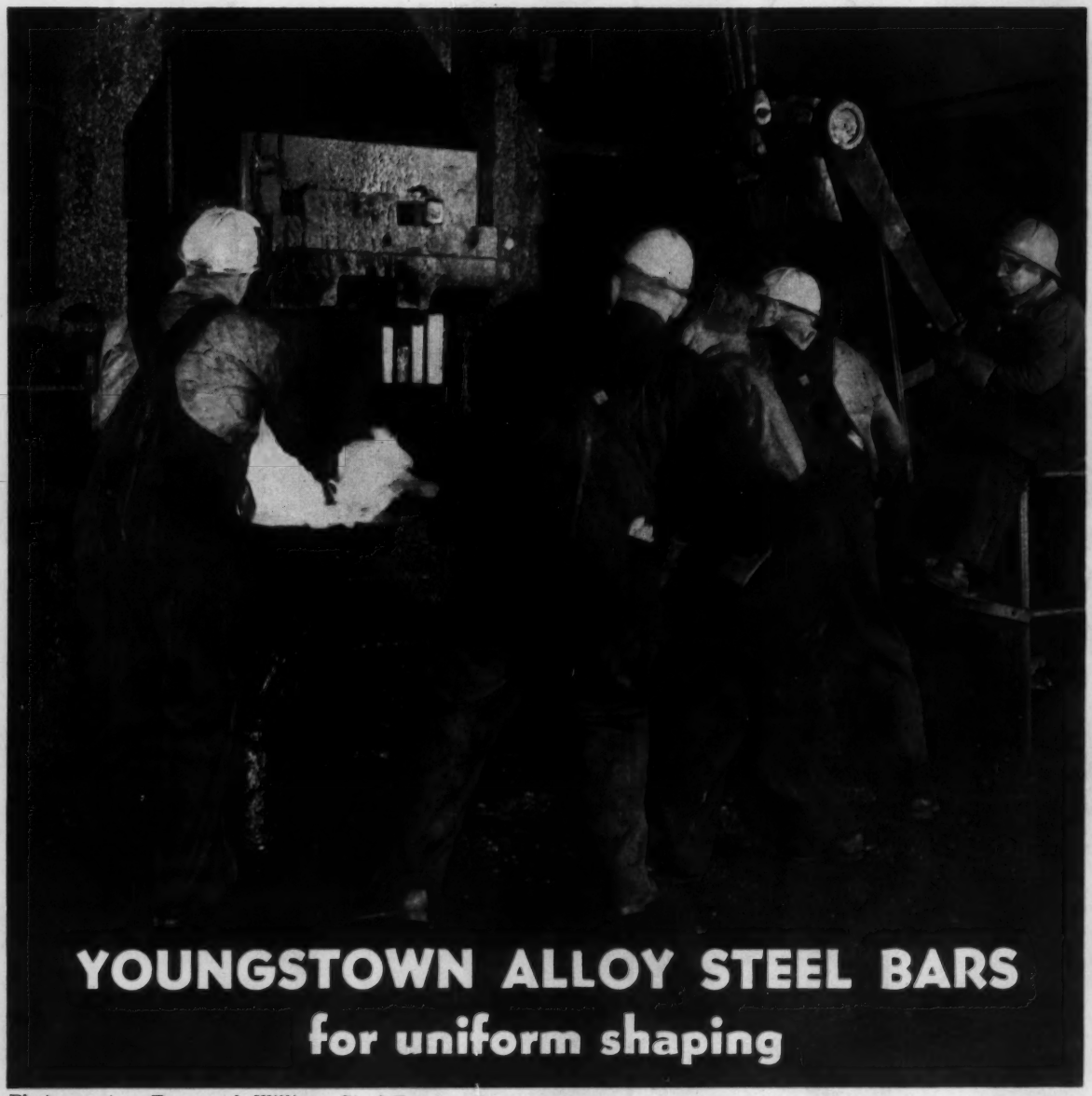


Photo courtesy Transue & Williams Steel Forging Corp.

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●Quality control of Youngstown Hot Rolled Alloy Bars insures uniform chemical composition and mechanical properties, as well as uniformity of dimensions. These desirable characteristics result in minimum forging rejects and less loss in flashings.

THE YOUNGSTOWN SHEET AND TUBE COMPANY

Manufacturers of Carbon, Alloy and Yoloy Steel

General Offices: Stambaugh Building - - Youngstown 1, Ohio
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"...and then they put that hot bar of metal between the upper die and the lower die and.....WHAM!"

Look who's showing off! Well, he doesn't know everything—yet! But he sure has learned something about his old man's forging business from that color booklet in his back pocket.

It's called "Forgeland, U.S.A."—an interesting, instructive book about *your* business and *ours*, written in *his* language and with pictures, too! We've prepared it here at Erie, because we think it's nice for Pop to be a hero in his own home—and we're all for encouraging it.

To quote your beloved smart-aleck, "Aw c'mon Dad, get me the book will yuh, huh, please, huh, please—it's for FREE, anyhow . . . not even any box tops or hammerscale to send in!"

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FORGING HAMMERS • TRIMMING PRESSES • HYDRAULIC PRESSES AND ALLIED EQUIPMENT

NOW AVAILABLE!

Carpenter PVC pipe and fittings for cost-saving corrosion control

● Here is a new Carpenter service to help processing plants cut piping costs for handling a wide variety of corrosives under moderate operating temperature and pressure conditions. Carpenter PVC Plastic Pipe and Fittings are admirably suited for such piping requirements because of the excellent corrosion resistance, strength and other desirable properties of the unplasticized polyvinyl chloride from which they are made. They withstand both oxidizing and reducing conditions. For this reason, Carpenter PVC Pipe and Fittings supplement other corrosion-resistant piping materials previously made available by Carpenter research and production advances in stainless and specialty steels.

Two types of Carpenter PVC Pipe and Fittings are available—No. 1 provides outstanding chemical resistance along with high strength, toughness and rigidity. No. 2 provides high impact strength and excellent corrosion resistance. Both types are available in eight pipe sizes of ½" to 4". Pipe is made in Schedules 40 and 80. A full line of Schedule 80 threaded and socket fittings is available.

Easily and economically installed with usual piping tools, Carpenter PVC Pipe and Fittings assure trouble-free service with cost economy. Why not look into the advantages of using Carpenter PVC piping systems in your plant? Consult your nearby Carpenter Distributor or Representative and ask for new Technical Bulletin T.D. 119.

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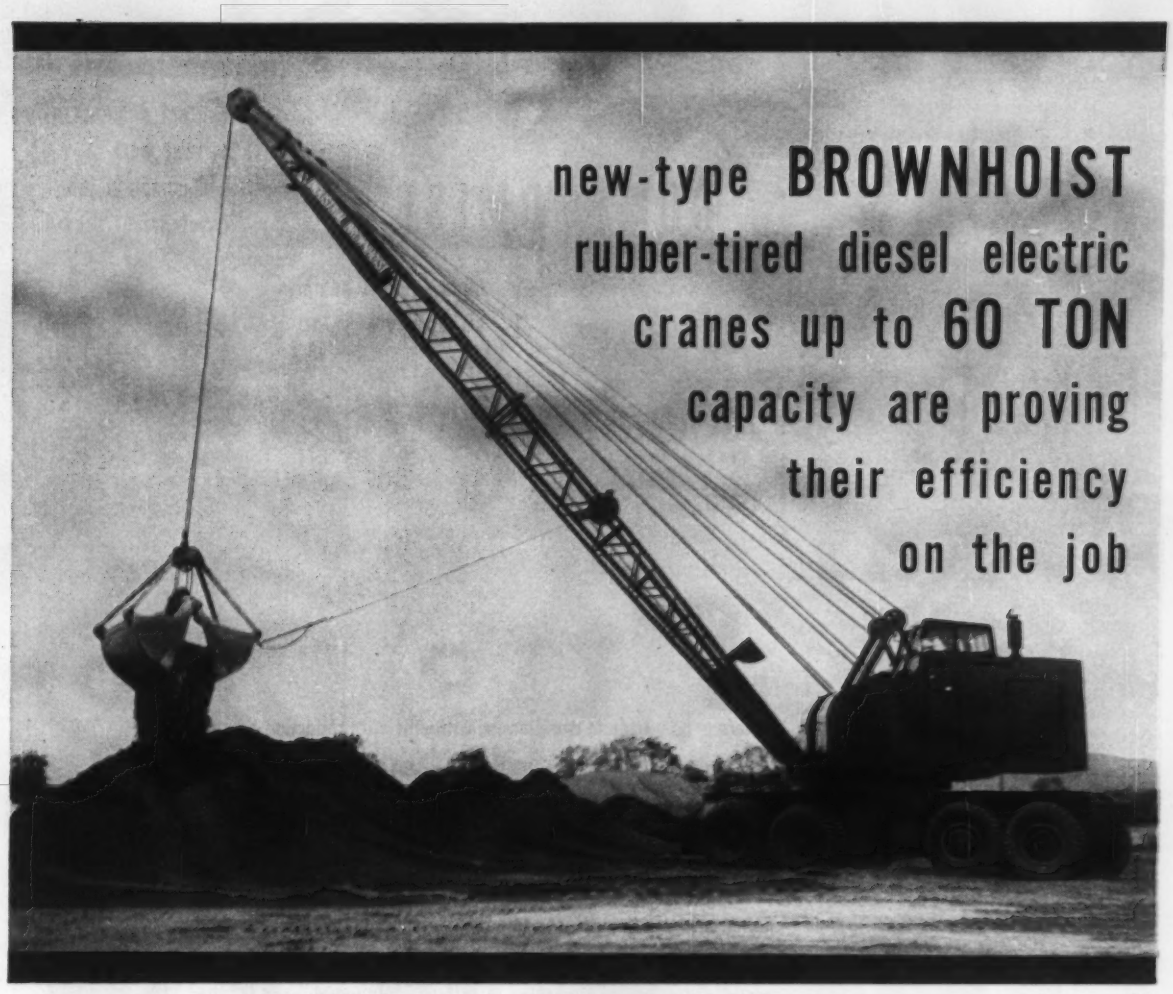
PVC Pipe and Fittings



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BROWNHOIST MATERIAL HANDLING EQUIPMENT GIVES A LIFT TO AMERICAN INDUSTRY

INDUSTRIAL BROWNHOIST CORPORATION
BAY CITY, MICHIGAN • DISTRICT OFFICES: New York, Philadelphia, Cleveland, Chicago, Denver, San Francisco, Montreal • AGENCIES: Detroit, Birmingham, Houston

The new Brownhoist Wagon-Cranes are specifically designed to do an outstanding job wherever high mobility and high capacity are required. You'll see them at work performing heavy duty jobs in mines, quarries, steel mills, for railroad and lumber operations and for many other large industries. Equipped with dynamatic clutch, anti-friction bearings at all essential points, power steering, electric travel and electric rotation. Mounted on a 12 wheel crane carrier capable of speeds up to 8 miles per hour, the unit can be operated by one man from easy-to-reach controls. Economical to operate. Available in capacities from 25 to 60 tons. For specification folder or further details, get in touch with our nearest representative or write us at Bay City.

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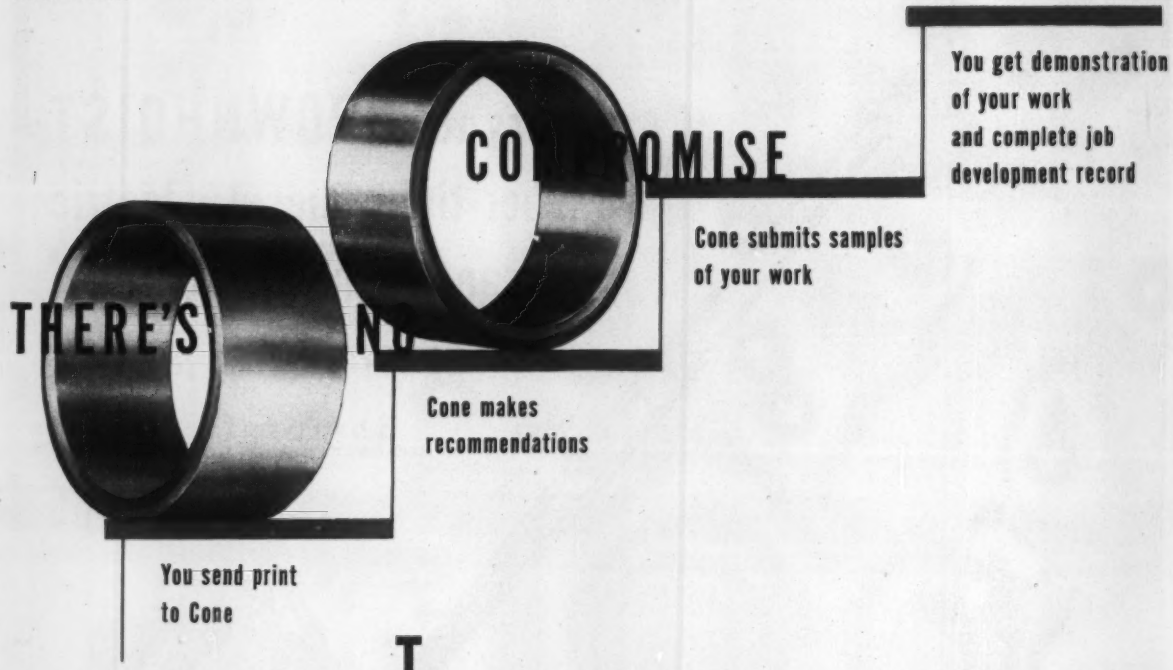
BROWNHOIST

No. 6 in a series


THERE'S NO COMPROMISE
You send print to Cone
Cone makes recommendations
Cone submits samples of your work
You get demonstration of your work and complete job development record

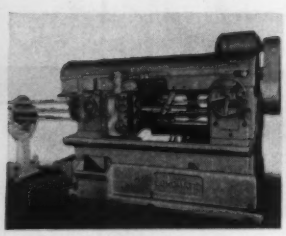
There is no adequate compromise with efficient production practices, if you are in business for a profit.

But you don't always know just how competitively efficient your equipment is. Case histories of what the other fellow is doing are sometimes garbled. At least the poor ones are not advertised. And conditions vary in all plants. Sometimes you have reason to be more concerned with what you don't want in new equipment than with what you do want. Cone believes too much is at stake for a machine to go into a line unequipped for the job, with either carbide or hss tools.

The Conomatic Carbide Development treats each job individually from standpoint of work, machine, tools, and operating personnel.

DATA FOR COMPARISON

Part	Bushing	Length	⅜"
Machine	1⅜" Conomatic	Hole Dia.	1¼"
Tools	100% Carbide Tipped	RPM	825
Material	8620	Time	14.8 Secs.
Stock Size	1⅜"		



Conomatic

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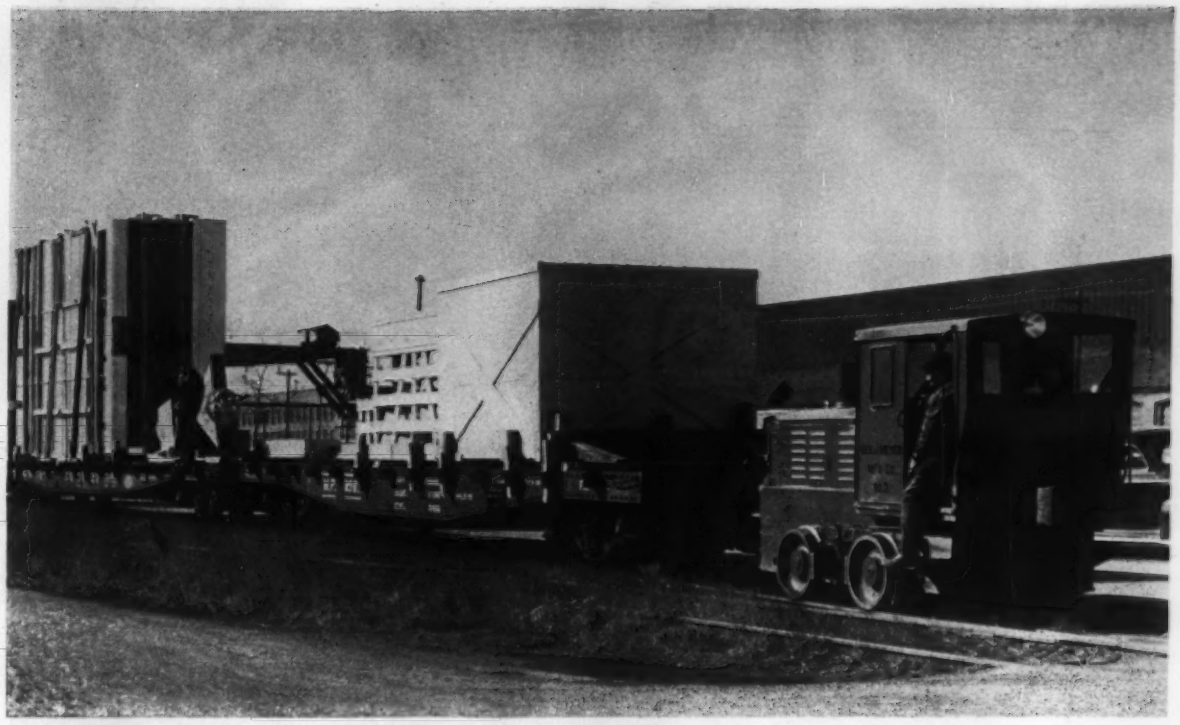
CONE AUTOMATIC MACHINE COMPANY, INC., WINDSOR, VT., U. S. A.



PLEASED WITH PLYMOUTH'S

steady pull and power

—So says Gilbert C. Rieck, Internal Transportation Foreman at the George J. Meyer Manufacturing Co., Milwaukee, Wis.

The world's largest manufacturer of bottle cleaning, filling, pasteurizing and labeling equipment for the bottling industry has only good things to say about their new Plymouth Torqomotive. Shown above hauling crated bottling equipment, this 9-ton model replaced an 8-ton Plymouth Locomotive used for sixteen years at their Cudahy plant.

"Our new Model DGT Torqomotive has new Plymouth features which have definitely increased hauling efficiency," reports Mr. Rieck. "It operates about 36 hours weekly over our 1½ miles of track, and has helped us realize substantial savings over our previous 8-ton model. Fuel consumption averages only 1½ gallons a day. Our operators are mighty pleased—especially with the *power* and *steady pull* resulting from Torqomotive Drive!"

The effortless, economical operation of Plymouth's powerful Torqomotive Drive can mean a big difference in your operation. Get more detailed information on this unique transmission. Latest bulletin will give you the facts on models from 3 to 70 tons, Gasoline or Diesel, mechanical and Torqomotive Drives*—also Diesel-Electrics. Address: *Dept. A-1, Plymouth Locomotive Works, Division of The Fate-Root-Heath Company, Plymouth, Ohio.*

PLYMOUTH* TORQOMOTIVES

*TORQOMOTIVE DRIVE: Plymouth Transmission coupled to Hydraulic Torque-Converter

ALSO BUILDERS OF F-R-H CERAMIC MACHINERY

Tunnel within a tunnel — 8500 ft. exhaust ducts are supported by seven-foot Monel hangers. along the top of each Holland Tunnel tube There's one every eight feet along the duct.

The Holland Tunnel that drivers never see

Drivers never see *this* tunnel because it is hidden above the ceiling—*a tunnel within a tunnel.*

It's part of a unique air exhaust system that completely changes the air in the Holland Tunnel every minute and a half. Since the famous tunnel connecting New York and New Jersey was opened in 1927, the system has proved so successful that designers of the Lincoln and other large tunnels have adopted it.

In working out this unusual exhaust system, Port of New York Authority engineers faced the problem of providing support for the tunnel ceiling, or — more correctly — the "exhaust duct floor." In order to minimize wind resistance, hanger rods from the tunnel shell to the duct floor had to be as thin as possible.

The answer — Monel nickel-copper alloy!* The strength of Monel alloy — plus its corrosion resistance — enabled the engineers to use hangers of minimum cross-section without requiring any allowance for corrosion.

A recent check showed these thin Monel hangers in as good condition as when installed. *No corrosion after 28 years, despite dampness and the high concentration of corrosive engine fumes in the exhausted air!*

When you have a metal problem, one of the Inco Nickel Alloys may be the answer to it. These alloys are all strong and tough. They can help you reduce weight . . . protect product purity. They can provide improved resistance to corrosion . . . or greater ability to withstand heat.

Write for "Standard Alloys for Special Problems." This booklet summarizes the properties, applications and available forms of all the Inco Nickel Alloys. You'll find a copy helpful in selecting the right metal for *your* job.

And, of course, we're always glad to work with you on problems. Don't hesitate to call us in.

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THE INTERNATIONAL NICKEL COMPANY, INC.

67 Wall Street New York 5, N. Y.

Metalworking Outlook

Economic Profile

Business for the next six months will go along much as it has in the first three. The upturn will come in the last quarter, led by autos. The FRB industrial production index thus far this year has averaged 143, compared with 139 last year. Look for a 145 average in 1956. Gross national product thus far is running at a $400-billion annual rate, compared with $387 billion last year. Expect GNP to hit between $405 billion and $410 billion in 1956. After-tax corporate profits this year should reach $23.5 billion, compared with a $22.4-billion annual rate achieved in the fourth quarter of 1955. Prices will continue to edge up.

Labor Notes

The International Union of Mine, Mill & Smelter Workers will demand a uniform general wage increase of 20 cents an hour, jobless pay and a number of fringe benefits in negotiations for new contracts this year . . . Steelworker President David McDonald's blast at U.S. Steel Corp.'s annual earnings report is a standard prenegotiation procedure. The union statement errs in saying that the increase in the tin plate price is effective Apr. 1. The date is Apr. 30.

Navy To Replace Tools

Of the Navy's 145,000 machine tools, 2 per cent are more than 15 years old; 38 per cent are between 10 and 15 years old; 3 per cent are between 5 and 10 years old and 57 per cent are less than 5 years old. Assistant Air Force Secretary Dudley C. Sharp told machine tool builders meeting in Houston last week that the Navy will start a new replacement program. Tools bought before 1941 will be disposed of if they need repair. Tools bought from 1941 to 1946 and requiring 25 per cent or more of their acquisition value for full repair will be disposed of. Tools bought after 1946 that require 35 per cent or more of their acquisition value for repair will be disposed of. A repair ceiling of $3500 per unit has been set. Some $70 million has been authorized this fiscal year for starting this modernization program. Watch for a continuing program.

Tool Orders Slip

New orders for machine tools in February totaled $86 million, 25 per cent lower than the $115.2 million recorded for January but still 39 per cent higher than the totals racked up in 1955's February. Executives in the industry and in the National Machine Tool Builders' Association are not alarmed by the drop in February. Shipments for the month rose to $64.6

Technical Outlook—p. 95 Market Outlook—p. 125

million from $54.6 million in January. The February totals were 30 per cent higher than shipments for the like 1955 month.

Storm Over Exports

Senators are kicking up a storm about Free World shipments of strategic materials behind the Iron Curtain. Involved are machine tools, generators and turbines, diesel engines, copper wire, aluminum and its alloys, nickel alloys, molybdenum alloys and magnesium. Sen. John McClellan (Dem., Ark.) heads up a Senate subcommittee checking into the matter. The controversy could affect the fate of the President's $4.9-billion foreign aid program and the export control act, coming up for extension June 30. Administration men claim: The problem is that our allies need export markets to survive; all the U.S. can do is try to persuade them not to ship certain products.

Atomic Matters

Bethlehem Steel Co.'s shipbuilding division has a Navy contract to conduct design studies on a nuclear propulsion plant for a surface warship in the 8000-12,000-ton range . . The Atomic Energy Commission has finished reviewing 30,773 research and development reports. Results: 10,916 were declassified; access-permit holders can look at 14,157 reports still classified as confidential or secret; the remaining 5700 reports will be withheld because of their relation to weapons or military propulsion reactors . . . The Navy's atomic objective: Atomic propulsion of all major combat ships sometime in the 1960s.

Research: More, More

Some $5 billion is being spent this year on research in the U.S., $3 billion of it in industrial labs. Union Carbide & Carbon Corp.'s David Swan says that for every $1 billion expended in industrial research, from $5 billion to $20 billion must be invested as capital to take advantage of the results.

To Buy a Ford

An average wage earner can buy a new Ford with 26 weeks' pay, says Ford Motor Co.'s R. J. Eggert. That compares with 31 weeks' pay in 1949 and 1941. He predicts consumer buying of all goods will hit a record $262 billion this year, 4 per cent of which will be for autos.

Aid for Small Business

Proposed U.S. contracts worth more than $260 million were reserved for exclusive competitive award to small firms during the first eight months of this fiscal year, says the Small Business Administration. That's $18 million more than was reserved in the corresponding period of last fiscal year. In the first eight months this fiscal year: Prime contract referrals were made to small firms resulting in more than $198.3 million in contract awards; procurement counseling and aid were provided to 14,166 small companies; prime and subcontract opportunities were referred to 64,322 small firms.

look at the EXTRA STRENGTH *in these gears*

Notice how the teeth are continuous across the face of each gear in the photo? That is a characteristic of Farrel herringbone gears, which, instead of a useless center groove, have a *backbone* where the helices meet. This puts the entire face width of the gear to work for you. It pays off in *extra strength* and greater load and shock capacity — in smaller space.

The answer lies in the unique method of manufacture. The machines that cut Farrel gears—famous Farrel-Sykes generators—make continuous tooth herringbone gears. The center groove required for tool clearance by other machines is replaced by useful working tooth area.

Backbone comes in any size up to 23 feet diameter — for virtually any application. Ask for details.

FARREL-BIRMINGHAM COMPANY, INC.
ANSONIA, CONN.

Plants: Ansonia and Derby, Conn., Buffalo and Rochester, N. Y.

Sales Offices: Ansonia, Buffalo, New York, Boston, Akron, Detroit, Chicago, Minneapolis, Fayetteville (N. C.), Los Angeles, Salt Lake City, Tulsa, Houston

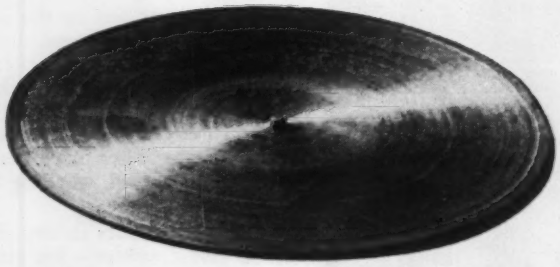
FB-1070

This comparison shows the greater tooth area of the Farrel continuous tooth herringbone gear (left) which gives it greater strength than the double helical gear with center groove (right).

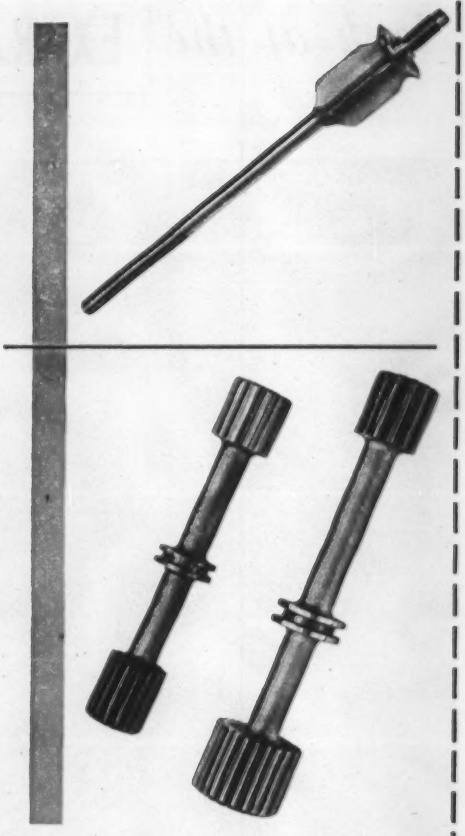
Farrel-Birmingham®

Type 431 Stainless

Armco 17-4 PH



Stainless steel discs hardened to Rockwell C40 to 41 looked like this after heat-treating.



How Armco 17-4 PH Stainless Steel cured these heat-treating headaches

These parts were causing plenty of headaches for heat treat and the rest of the shop until they were made of Armco 17-4 PH Stainless Steel.

High temperatures required to harden grades formerly used caused severe distortion. This meant heat treat was saddled with costly, time-consuming straightening operations—plus the job of removing heavy scale.

Armco 17-4 PH eliminates these shop headaches. Distortion and scaling don't occur because this unusual high strength stainless steel can be fully hardened by heating at only 850 to 900 F for 1 hour and air cooling. With this low-temperature heat treatment, parts remain within tolerances and have only a light heat-tint discoloration.

These cost-cutting advantages also mean that you usually can finish-machine Armco 17-4 PH stainless parts before heat treatment. You don't have to reroute to the machine shop for finishing in the hardened condition.

If you are making hardened parts for corrosion resistant applications, Armco 17-4 PH Stainless Steel may help you cut costs and boost production.

Write us for complete information on this special easy-to-harden stainless steel. It is available in billets, bars and wire. Also ask about Armco 17-7 PH Stainless—produced in sheet, strip, plate, bars and wire.

ARMCO STEEL CORPORATION

976 CURTIS STREET, MIDDLETOWN, OHIO

ARMCO®

SHEFFIELD STEEL DIVISION • ARMCO DRAINAGE & METAL PRODUCTS, INC. • THE ARMCO INTERNATIONAL CORPORATION

Investing in Steel's Growth

The steel industry earned more than a billion dollars in 1955—a new high for dollar earnings, although profits as a percentage of sales have been higher.

In coming weeks you can expect to hear much about steel earnings. Labor unionists, coming to the bargaining tables, will make much ado about them.

Steel consumers, facing the probability of higher steel prices by midyear, will grumble.

Some of the discussion will be more emotional than factual. But the facts deserve serious and dispassionate study by all metalworking people.

Steel is in short supply even though operations are at practical capacity. We have had steel shortages during many of the postwar years. Any time shortages have been acute, we have had interference with manufacturing operations, unemployment and other dislocations. Gray markets and premium prices have appeared, and the consumer has paid more for end products.

Steel capacity must be increased by about 20 million tons during the next five years. The cost will be about $4 billion. Then we will need to build still more capacity, and the cost will be much higher. It will involve new plants costing four to five times as much as existing capacity.

Where will the money come from?

There are three possible sources: Depreciation recovery, now inadequate because it does not account for inflation; borrowing or sales of securities; or larger profits to reinvest in the business. Realistically, funds will have to come from all three sources.

Ernest T. Weir, National Steel Corp. chairman, presented the case for steel producers before the New York Security Analysts. When National's present expansion is completed, he indicated its next project will be a new 2-million-ton plant, costing a minimum of $650 million. "National certainly cannot go out on the market and finance the full $650 million . . . the best we could expect to do through the sale of securities would be to raise $400 million. This means that when we start building the plant, we must have accumulated against this project the sum of $250 million . . .

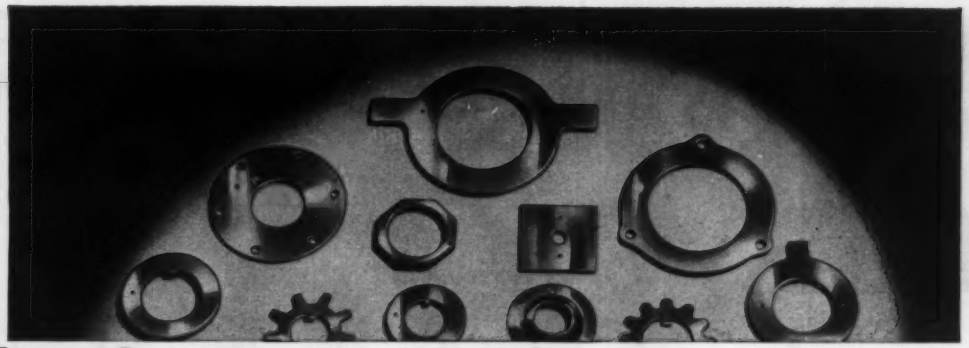
"This simply cannot be done on the present earnings basis . . . there is one answer and one answer only . . . the selling price of steel must be advanced materially."

The situation is analogous to the highway program. We all want more and better roads. The expense is heavy. If we want adequate highways, we'll have to pay for them.

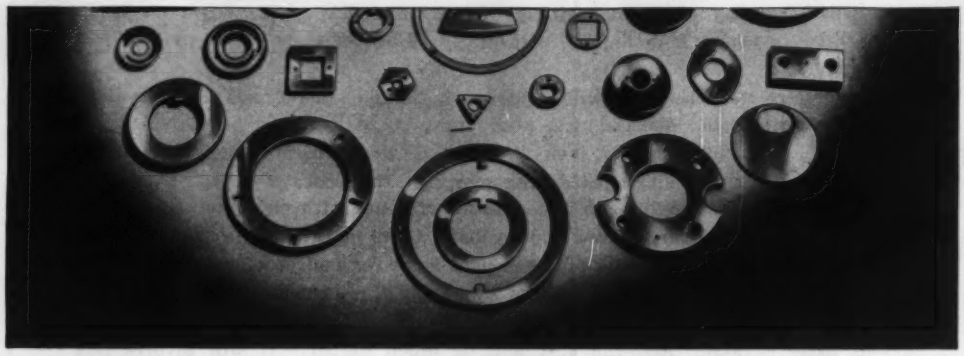
If we want an adequate supply of steel, we will have to pay for it.

Walter J. Campbell

EDITOR



"Quality" is an Important Word in the Purchase of WASHERS, too



Never before has Industry, as a whole, been more conscious of Product Quality than in today's competitive market. In the final analysis, no piece of equipment is any better than its smallest, least noticed components, such as WASHERS... essential to secure, permanent *fastening* and *holding* of vital parts.

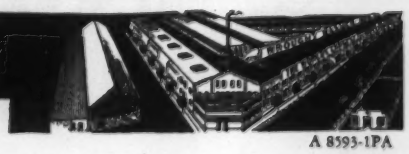
In the manufacture of Milwaukee Wrot Washers, *uniform high quality* is a production policy that is strictly adhered to and maintained... and yet does not involve a cost penalty to the purchaser. You get the best the market offers, competitively priced, plus assurance of a dependable source of supply... when you specify "MILWAUKEE WROT WASHERS"... standard and special washers of every description, in all sizes, with over 100,000 sets of dies available to meet your specifications.

Send us your specifications and let us quote on your requirements for washers and stampings of every kind.

WROUGHT WASHER MFG. CO.

THE WORLD'S LARGEST PRODUCER OF WASHERS

2103 SOUTH BAY STREET • MILWAUKEE 7, WISCONSIN



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Skilled Workers Restless

The shortage of skilled labor is the basic cause of much job hopping and other signs of dissatisfaction. Here are suggestions on what to do about the problem

"PIRATING among companies—the old law of supply and demand—that's creating most of the skilled labor problems."

So charges a disgruntled Cleveland personnel director. He explains: "We're not losing skilled men because of a wage differential; it's because we're not working overtime at the moment. Busy small companies come along with six-and-seven-day-work-week offers, and the men grab at them."

Symptom — In Michigan, the Society of Skilled Trades is attempting to form a skilled workers' union by luring members from the United Auto Workers. Its charge: UAW hasn't taken care of the skilled worker—the wage gap between nonskilled and skilled labor continues to narrow; the recent Supplemental Unemployment Benefit contracts took 5 cents out of the skilled pay envelope.

Skilled workers are getting restless; many firms report above-average turnover that's increasing monthly—particularly in the higher skills, such as toolmakers and die sinkers.

Cause—But are narrowing pay differentials the primary cause? Most industrial relations experts say no. Wage rate comparisons—particularly in the auto industry—bear them out (see table on page 54). The differential between a sweeper and toolmaker in 1940 was 36 per cent; today, it's 34 per cent. But the differential between an assembler and a toolmaker has increased from 24 to 26 per cent in the same period.

The real crux, most feel, is the shortage of skilled labor. A vice president of a major midwest equipment maker says: "The skilled labor situation is getting worse, though it's not yet as serious as the problem of getting and keeping engineers." These factors are compounding the problem: Lack of apprentices, technological developments, industrial expansion.

Proof—Take a look at some of the Labor department statistics: In January there were nearly 5000 skilled metalworking job openings listed with state unemployment agencies. This compares with about 2000 similar openings a year earlier. Bear in mind, too, that these figures probably are considerably below demand. Public agencies do not hold orders for all job vacancies in their areas.

Who's pinched the tightest for skilled labor? With few exceptions, loudest complaints come from companies with no apprentice programs. But even firms with the best programs have trouble keeping pace because of plant expansions and loss of men through turnover.

Training — Thompson Products Inc., Cleveland, for example, is stepping up both its learner and apprentice programs. On one project alone, 100 new Bullard Manitrol operators are being trained.

Says Theodore Haas, Thompson's director of training: "Both management and labor are inclined to view the skilled labor problem apathetically. We should be training a minimum of one apprentice for every ten journeymen."

One of the auto companies feels its skilled labor requirements for the future necessitates one apprentice for every five journeymen.

Justified—To the claim by many companies that apprentice programs cost too much, proponents counter: Figure your hiring costs, lost production or overtime paid to others to get the work out and you'll find it's a pretty good investment.

Some claim difficulty in finding qualified apprentice applicants. Says a Detroit vice president: Set up a good program and you'll have little trouble. We have 42 applicants for four die model building openings; 131 applicants for 51 electrician apprenticeships. We are short in the toolmaker classification, but even here we had 59 applicants for 69 openings.

Technological developments are important in the skilled labor problem. Not only will the ratio of skilled workers in the work force

be increased, but the skill requirements will change.

Future Needs — Automation in the auto industry already is stepping up the skilled worker ratio. One automaker reports that its skilled labor ratio has increased from 6 to 10 per cent of the total hourly work force. Another predicts that 15 or 20 per cent of the industry's work force will be skilled in the future.

Greater complexity of equipment demands greater skills to repair and maintain it. Paul Minsell, director of industrial relations at Eaton Mfg. Co., believes that the next 15 years will be an era of more combined skills to meet the technological changes. Chrysler Corp. currently is conducting educational programs in industrial electronics, electricity and hydraulics to bring its journeymen up to date with the increasing complexity of its machinery.

Your Program—Apprentice programs should be geared to those requirements. The aircraft and guided missile industry already faces the problem. A case in point: Aircraft mechanic apprenticeship. In addition to the usual machinist's training, the apprentice gets training in electrical and instrument maintenance and repair, hydraulics, welding and interior fitting work. True, the apprentice probably will become a specialist in only one phase, but the background is necessary if he is to be effective in his job.

Don't look for an improvement in the skilled labor situation in the short term. You can calm some of the unrest by staying away from the Ford-type SUB and by granting percentage increases or skilled wage differentials in your contract negotiations. But the real answer is getting more men into the skilled labor force—through your own apprentice programs.

• Extra copies of this article are available in quantities from one to three until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, O.

Engineer Shortage

ASME head says problem starts in grade schools and comes to a head in the high schools

AMERICA's shortage of engineers and scientists will grow more acute because of the demands of automation, says Joseph W. Barker, president, American Society of Mechanical Engineers.

He says there is no national answer to improving educational standards but cites measures found successful in some communities: 1. Use of teacher aides. 2. Sharing of faculties in smaller high schools. 3. Industry co-operation. 4. Use of active engineers as teachers on a part-time basis and retired engineers on a full-time basis. 5. More realistic pay scales.

A Change—Dr. Barker suggests that mathematics and science teachers should be paid more than teachers not in demand by private firm. He declares: "I admit that it would create certain personnel difficulties if you paid more to a teacher of chemistry than you did to a teacher of French. The simple truth, though, is that industry is not offering large salaries to teachers of French. The educational system is not immune to the laws of supply and demand."

Part of the trouble in the schools, he states, is that children of school age now are part of the baby boom of the 1940s, while many teachers must be drawn from the small generation of the 1930s.

Russians Ahead — Dr. Barker places America's shortage of engineers and scientists at 50,000 and notes that over the last 25 years Russia has reportedly turned out three engineers for every two of ours.

Auto Workers' Pay: Little Differential Change

(Base hourly rates)

	1956	1950	1945	1940
Toolmaker Highly Skilled	$2.69	$2.075	$1.60	$1.25
Millwright Skilled	2.485	1.875	1.35	1.05
Major Assembler Semiskilled	2.005	1.575	1.15	0.95
Sweeper Unskilled	1.805	1.375	0.95	0.80

Enough Columbium, Tantalum?

Columbium and tantalum both on scarce list in the U.S. since before the Korean War, are in sufficient supply to meet all known civilian uses, the Bureau of Mines believes.

The metals are especially vital for jet engines and special electronic equipment. In everyday uses, they go into new steels and a variety of products, ranging from camera lenses to fountain pens. Possible new civilian and military applications, retarded by wartime conservation, now may be developed.

Companies that produce metals from columbium and tantalum ores informed the Bureau of Mines that they can handle all demand. In fact, they say they could produce three times the amount of columbium being consumed for civilian uses.

Last year, domestic consumers, including the Armed Forces, used less than half of the more than 5000 tons of columbium and tantalum mineral concentrates available, so the government stopped purchasing these minerals last May.

Columbium and tantalum are produced principally as by-products of tin mining in the Belgian Congo, Malaya, and Nigeria. The latter furnished the U.S. with nearly 60 per cent of the more than 9 million lb of columbium imported in 1955. Some 2 million lb of tantalum were brought into the U.S. last year.

Rem-Cru Titanium Inc.

More coils like this may be going to industrial markets as . . .

Titanium Hunts Civilian Uses

LIGHTWEIGHT passenger trains, trailer-truck frames and ship plates —all using titanium—are forecast by Leo J. Barron, a Du Pont metallurgist.

He told a meeting of the American Association of Mining & Metallurgical Engineers that although many of titanium's uses are being restricted by price levels, the metal is being employed frequently where resistance to corrosion is vital.

Civilian Markets—Du Pont has a development program which ranges from chemical and food processing equipment to marine hardware for sailboats.

"In many uses, under extremely corrosive conditions, titanium has far outlasted conventional metals, in one application by a ratio of more than 1800 to 1," Mr. Barron reveals.

Important Property—This chief property — corrosion resistance — is of great significance in nondefense applications and is of possible greater importance in the long-range future of the metal, Mr. Barron adds.

Another important property, titanium's strength-weight characteristic, indicates a good future in lightweight passenger trains, automobile trim and frames of trucks.

Less Expensive — In discussing costs, Mr. Barron explains that in a unit requiring 1/16-in. stainless steel, the stainless sheet would cost about 83 cents a pound. A titanium sheet would cost $15 a pound, nearly 18 times as much.

But titanium weighs only 56 per cent as much as steel. On this basis, the cost factor here for titanium would drop ten times, he points out. Because raw material represents only a fraction of the cost of the finished assembly (assuming 20 per cent in both stainless and titanium), a piece of titanium equipment can be three times cheaper than one made from other materials.

"Obviously, every day of increased service life beyond this price difference is of direct economic benefit," Mr. Barron asserts.

Time Saving—Another important feature for end users, he says, is reduction of down time costs during replacement. He gives this example: Titanium replaced Type 309 stainless in a thermowell installation in high-temperature nitric acid service. The stainless unit cost about $95 and lasted six months. Its replacement cost, including down time and labor, amounted to $1250. The titanium thermowell cost $300, but it has a service life estimated at five years. "There was no hesitation in making the titanium installation," Mr. Barron declares.

What's New—Among other new uses for titanium, Mr. Barron discusses these:

1. Steam jet diffusers used to create process vacuum are subject to corrosion by high velocity steam and dilute hydrochloric acid. Original diffusers were made of cast iron and had to be replaced every three months in one installation. Three years ago, titanium diffusers were installed, and after continuous service, they still are in operation, with no sign of corrosion.

2. The exceptional resistance of titanium to sea water and marine atmosphere makes it excellent for marine uses, such as dockside equipment, sea water valves and intake screens. Titanium also will find use in the distillation of fresh water from sea water.

Make Sales Dollars Pay

The formula: Identify major accounts, so salesmen don't waste time with those having little potential; set your quotas; establish a rating system of sales performance

THE SALESMAN leaned his brief case against a chair leg and let his eyes canvass the reception room of Wenevrbye Inc. He always enjoyed calling there. The main office building was less than five years old and fitted out with all the accommodations of a modern business . . . air conditioning, comfortable waiting rooms, a really fine coffee shop. And the people were pleasant. He caught the eye of the receptionist. "I'm sorry, sir, Mr. Ucantcellmi is still in conference."

The salesman lit his sixth cigarette in an hour. Thoughtfully, he picked up his brief case and began to thumb through old orders from Wenevrbye: Ten orders totaling $10,000 in the last year. "Let's see," he thought, "the home office tells me I have a million-dollar territory. Now how many times did I call on this outfit to sell them $10,000 worth of goods?"

Major Accounts — Prodded a little by his hour's wait in the reception room of Wenevrbye, the salesman was about to exercise a little sales control — something that should have been taken care of months before by his sales manager; something that can be overlooked easily by management in its efforts to keep the salesmen making calls.

Reynolds Metals Co. found out after World War II that 10 per cent of its aluminum customers were accounting for 80 per cent of sales. Reporting to the National Industrial Conference Board, David P. Reynolds, vice president of general sales, said: "Our salesmen were spending a large part of their time working with accounts that did not have major potential, at the time, or for the future."

Hurt Distributors — One result of Reynolds' analysis was the discovery that it was hurting its own distributor organization, which was set up for the explicit purpose of handling small orders.

The smaller customers were hurt, too. Better service and deliveries than the central office could offer were available to them through distributors.

Identification of major accounts is the first step to effective sales control. Reynolds combined field information with marketing reports to learn how much was being sold where, and what the future requirements might be.

Salesmen's time was freed to work on major development projects—with the people who didn't use aluminum, but would buy in quantity if they did.

Simple Target — Sales quotas, Robert M. Evans, general sales manager, Talon Inc., told the NICB, may take many forms, all of which must be linked to the salesman's compensation.

There are three basic ways to set a simple target: 1. Based on the potential of a territory. 2. On the salesman's share of total company production. 3. On the volume necessary to reach a break-even point.

Talon pays a base salary plus. The plus must be a sufficient proportion of a salesman's earnings to provide proper incentive. Quotas are revised quarterly—a flexibility that enables Talon to account for general economic forecasts, introduction of new products, advertising and sales promotion.

Sales Performance—Three comparisons can be made to answer "how are we doing?": 1. How you compare with the industry as a whole (per cent of industry volume). 2. How your results compare with your goals. 3. How your performance compares with how you did in the past.

Elmer G. Rahe, vice president-sales, Globe-Wernicke Co., told NICB that those comparisons should be followed with a personal analysis of the salesman (see check list). The percentage of potential is the most important item, and is based on the territory's total market after a breakdown by states, counties, cities or whatever divisions are applicable.

A simple rating system from one to ten can be devised for the other factors on the check list, with the sales-expense ratio given in terms of the salesman's ability to stay within his expense account.

Check List for Your Salesman's Performance

Percent of potential sales obtained
Sales-expense ratio
Job knowledge: Prices, products, policies
Personal characteristics: Appearance, energy, initiative, attitude
Ability to manage
Home office relations
Customer relations

New Boat Doubles Speed

A speed of 26 knots was clocked by the *Solar Meteor* (a gas-turbine-powered boat) on its first demonstration run.

The craft is a joint project of the U. S. Navy Bureau of Ships and Solar Aircraft Co., San Diego, Calif. It is a standard, 40-ft, Navy personnel boat fitted with a 500-hp Jupiter engine.

The variable-speed, gas-turbine engine hits the scales at abou. 1000 lb, less than a quarter of what a comparable marine diesel engine weighs.

Both government and industry can benefit by eliminating . . .

Waste Through Duplication

THE GOVERNMENT's war on waste by duplication has fixed many standards which are tested and ready for use by private industry. Continued co-operation between government and industry to reduce the number of items purchased by the government can be expected.

That's the progress report on federal standards given to the National Electrical Manufacturers Association by two government spokesmen: Roger E. Gay, director, Cataloging, Standardization & Inspection, Office of the Assistant Secretary of Defense (Supply & Logistics), and Willis B. MacLeod, director, Standardization Division, Federal Supply Service, General Services Administration.

Co-operation—NEMA members were urged to develop product standards more suitable for government use in purchasing electrical equipment. Problems of special concern to the government: Designing from a wide choice of standard components; development of standards for high-mortality parts.

Mr. Gay indicated electric motors and generators as products containing high-mortality parts for which standards are especially needed.

Industry Standards — Government use of industry, technical society and trade association standards "is the smart and economical thing to do," Mr. MacLeod said.

Other organizations contributing to government standards include American Standards Association, American Society for Testing Materials and Underwriters' Laboratories Inc.

Cataloging — The Defense department's cataloging program (STEEL, Feb. 27, p.76) is establishing a uniform language for supply items within the Armed Forces. By last December 2.2 million items were identified under the system; another 700,000 will be included by the end of 1956. Complete conversion to the new system will be completed by 1959.

Civilian cataloging is moving along, too. Congress has supplied funds for the cataloging of 28,000 GSA and federal supply items this fiscal year. Another 102,000 will be cataloged next year if Congress appropriates funds.

Civilian and Defense department efforts are co-ordinated to achieve a uniform catalog. Mr. MacLeod pointed out that some 770,000 civil agency items remain to be cataloged, if the system "is ever to be really effective."

Example—The government buys nearly 3 million different items, but some of the differences are trivial—for government purposes needless and expensive.

Savings achieved in one year will exceed many times the cost of developing the standard. Elimination of half the government's supply items may be achieved through the cataloging and standards systems now being adopted.

Industry Use—Of the more than 3600 federal specifications and standards, many are perfectly suitable for widespread adoption by private industry, Mr. MacLeod said.

Insuring the Atom

Government may backstop private companies in covering atomic reactor risks

YOU ARE SUED as a result of an accident in an atomic reactor using your components. Are you covered by insurance?

It looks like the answer will be yes. But many details are still to be settled. Here's how the broad outlines shape up: Private insurance companies will cover day-to-day claims. The government will backstop them to protect against major disaster.

Consensus — These are conclusions of preliminary reports made by Columbia University for Atomic Industrial Forum Inc., New York, and by a group of ten insurance executives for the Atomic Energy Commission.

The AEC's study group says stock casualty and mutual companies are setting up funds that will give a pooled coverage of $65 million for third-party liability, and that another $50 million facility is being organized to cover physical damage to plant.

Problems—Rates will be hard to set, since there is little experience on which to base them. The AEC report suggests that they may be determined for each installation, depending on reactor location, purpose, power level, etc.

"Probability of a catastrophic reactor accident is small," notes the Columbia team. "But under existing legal rules, the reactor operator (and reactor component makers) could be subject to tort liability far beyond anything we've so far experienced." Its conclusion: Private firms cannot handle the job alone.

Steelways

Autos Show Strength

Passenger car sales will run between 5.8 million and 7.8 million annually for the next three years. The fate of the Independents may not be changed by an antitrust action

WITH NEW MODELS a little more than six months away, the automotive industry isn't as bad off as it was supposed to be. Dealers are optimistic about spring sales, and expect an orderly model clean-up to follow during the summer and early fall.

New car sales this year should be between 6.4 million and 6.7 million, down about 9 per cent from 1955, says McDonnell & Co., New York brokerage firm. A million trucks will be sold, about the same as last year.

Production of passenger cars will be down 20 per cent to between 6.3 million and 6.5 million. Truck production will continue at about 1.2 million. Lower sales and production have been expected this year; however, these estimates represent strength not previously hoped for by some experts.

Forecast—From 1956 through 1958 the American public should consume an average 6.75 million cars a year. That's a gain of 8 per cent over the 1953-1955 period.

In any one year from 1956 through 1958, sales could range from a low of 5.8 million cars to a high of 7.8 million.

Buick Pressure—Typical of the strength of the auto market this year is the Buick. It's putting plenty of pressure on other medium priced cars like Pontiac, Mercury and Dodge, and the Buick Special is making itself felt in competition with the higher priced Chevrolets, Fords and Plymouths.

If the '57 Buick is as new as some people think it will be, its share of the market will continue to grow in all price brackets.

Antitrust Action—When Hercules fought the many-headed Hydra, he was dismayed to see each head he cut off succeeded by two more. If the government pushes an antitrust action against General Motors Corp., McDonnell & Co. suggests that Buick and Chevrolet, as Independents with the same dealer organizations they have, might take an even larger share of the new car market. So there's the chance that neither Ford nor Chrysler would favor a GM split.

Whether such a split will aid the Independents is also doubtful.

No one is ready to deny that both American Motors Corp. and Studebaker-Packard Corp. face serious trouble in the next two years. The advanced look of the Studebaker has given way to the Detroit look, and it appears unlikely a higher priced Studebaker can compete directly with the regular products of the big three, McDonnell & Co. says.

American Motors may have dumped all its eggs in one basket—the Rambler. It's a guess that the American public is ready for a second car to replace the lawn mower in the two-car garage. Will the wife take to the smaller variety, or want the more luxurious kind, only a year or two older?

Race for First—This year Ford and Chevrolet continue to lead the pack in total sales. GM says Chevrolet is having its best year, and McDonnell & Co. predicts the division will end the year with more than 25 per cent of the market.

Ford car sales are down about 15 per cent, and it now is accounting for 20 per cent of the market.

In the Balance

Metalworking exports show the way as Britain struggles to pull trade balance out of red

THOUGH Britain's balance-of-payment problems are far from solved, January figures show that the situation may be coming under control. The drain on dollar and gold reserves was $207 million, lower than the rate for the first six months last year.

January metalworking exports rose to the highest levels ever. They rang in at close to $300 million, up 4.5 per cent from the fourth quarter, 1955. Machinery and aircraft showed the biggest gains.

Auto Scene—Despite the much-publicized slump in British automotive production, some sectors of the industry are doing well in export markets. Guy Motors Ltd., Wolverhampton, has just taken an $840,000 order for busses and trolley busses. Shipment is to be made to Johannesburg, South Africa.

Some British observers feel that the auto cutbacks may be healthy. They already have taken some strain off the sheet steel market. British mills will be able to divert production into plate and structural steel, both critically needed for other export industries like shipbuilding and railroad rolling stock.

With their domestic and export contracts combined, rolling stock fabricators have enough orders for capacity operations through the next two years.

Expansion—Steel mills are going ahead with plans to put in new capacity. January's ingot and castings production was at an annual rate of 21.75 million tons, another new record. It's estimated that as much as 21.5 million tons of steel may be made this year, up 1.5 million from 1955.

Atomic Partnership

AMF Atomics Inc., a subsidiary of American Machine & Foundry Co., New York, has joined hands with Mitchell Engineering Ltd., London, to design and build nuclear power plants in the British Commonwealth and other countries.

Says Gen. Walter Bedell Smith, chairman and president of AMF Atomics: "It's the first international agreement made by private industry to fulfill the promise made by President Eisenhower in his 'atoms for peace' speech."

Mitchell Engineering has been active in atomic energy since 1950. It's handling engineering and pipework for Britain's largest atomic power plant, and has other contracts in Portugal, Greece, Northern and Southern Rhodesia, South Africa, India and Australia. AMF Atomics will design the reactors and supply them and their components.

Other news in international atomics: General Electric Co., Schenectady, N. Y., has announced that it will supply the first atomic reactor to Spain. The 3000-kw facility will be used for research. It's to be built near Madrid for the Spanish atomic energy commission.

Underspending?

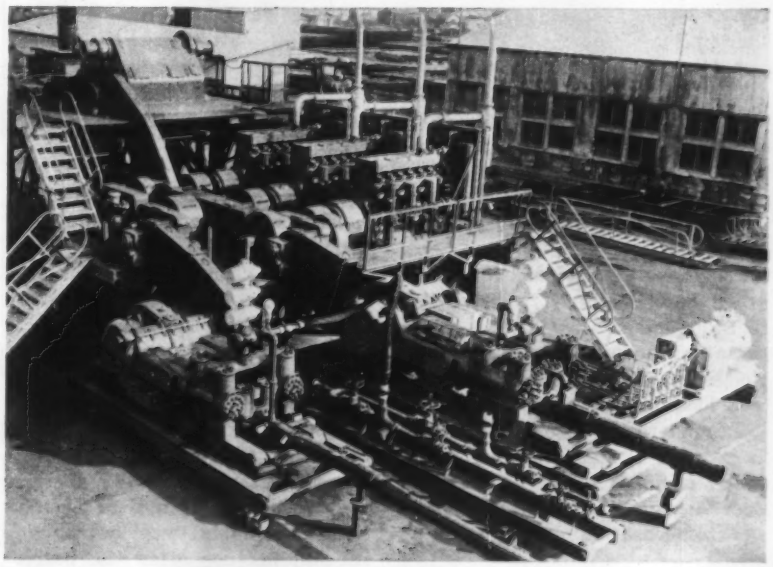
The U. S. government is spending $400 million a year on economic aid. It should be spending $1 billion.

That's the opinion of J. D. Zellerbach, chairman of the Committee for Economic Development, New York.

Money would go to "approved development projects" in the Middle East, Southeast Asia and Latin America. Mr. Zellerbach thinks that $1 billion a year is conservative. "Certainly it is not a sum which the $400-billion American economy cannot take easily in its stride."

Trade Notes

West German companies will provide 60 per cent of the foundry equipment for Venezuela's integrated steel mill. West German engineers will aid the Italian prime contractors in final planning and in supervising construction. A Swiss corporation is building the power plant . . . Indiana Steel Products Co., Valparaiso, Ind., buys Hayward Tyler of Canada Ltd., a foundry in Kitchener, Ontario . . . Bucyrus-Erie Co., Milwaukee, will build a $3.5-million plant, also in Canada . . . Georg, the Ruhr coal cartel, has finally succumbed. It's being replaced by three new independent marketing companies . . . Germany now has nine steel companies which each produce more than 1 million tons a year.



Oil Rig To Drill for Dutch Brine

National Supply Co., Pittsburgh, has shipped this oil drilling rig to Groning, in the Netherlands. It will drill brine wells to provide salt for Dutch chemical plants. Part of the equipment was made by National's British affiliate

Senator Humphrey aims at company officers, to put . . .

More Teeth in Antitrust Laws

THE CURRENT CROP of antitrust bills running through the Congressional hopper has a new addition, this one from Sen. Hubert Humphrey (Dem., Minn.).

The bill would take action against corporation officials who authorize actions that constitute criminal violation of the antitrust laws (price fixing, price discrimination, exclusive dealing and others).

Penalties—Convicted executives would be liable to forfeit to the U. S. an amount twice their compensation during the period of the violation. The bill also provides that such officials may be enjoined from rendering any service to their firm or to a competitor (permanently or for a period of not less than 90 days) and from receiving any compensation during such a period.

Says Senator Humphrey: "It is my opinion that direct civil liability of responsible corporate officials would make the antitrust laws more effective. It is one thing to fine a giant corporation for violating these laws; it is quite a different matter when the penalties may be imposed on an individual who is responsible for his corporation's policies and actions."

Reasons — Behind the bill is a record "barren" of fines and imprisonments for criminal antitrust violations. The senator points out: Courts and juries shy away from putting a criminal label on defendants, let them off too lightly. In 66 years of the Sherman Act only three men served jail terms. Fines in the last 12 months averaged only $1294, compared with the maximum allowed of $50,000. So far, only one fine has gone over the $5000 mark.

Some antitrust subjects (mergers, for example) were left out of the bill because often the people involved don't know they have broken the law until the government hauls them into court. Some observers think the same problems would arise in the case of some of the violations that the bill specifically aims to cover.

Capital Goods Exports Up

Shipments overseas of capital goods last year hit $3.8 billion, almost 27 per cent of total nonmilitary exports. Responsible for much of the rise are construction, excavating and mining machinery, machine tools, engines, turbines and pumps. Transportation equipment and electrical apparatus also figure.

A stepped-up effort by business and government to retain export markets and open new ones would go a long way toward helping the Foreign Aid program meet the challenge of the Communists' economic warfare tactics, says Marshall M. Smith, deputy assistant commerce secretary for international affairs.

Meet Robert E. Williams: Now serving as director, Communications Equipment Division, Business & Defense Services Administration, he's on leave from Automatic Electric Co., Chicago. This is his second WOC tour; during the Korean War, he was for six months director, Communications Equipment Division, National Production Authority. He can be reached in Washington at Room 4033, Commerce department. Phone STerling 3-9200, ext. 4821.

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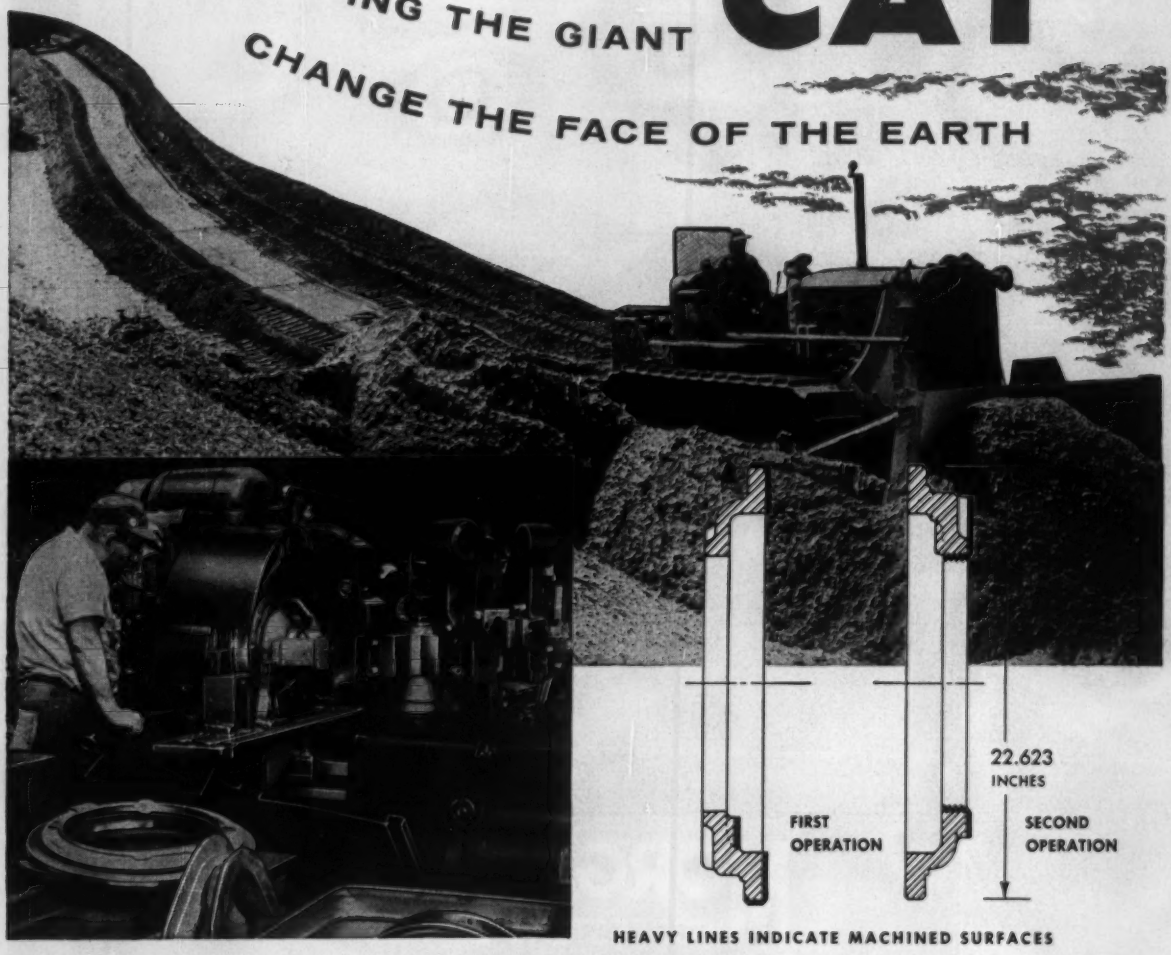
HELPING THE GIANT **CAT*** CHANGE THE FACE OF THE EARTH



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Bulletin No. 159

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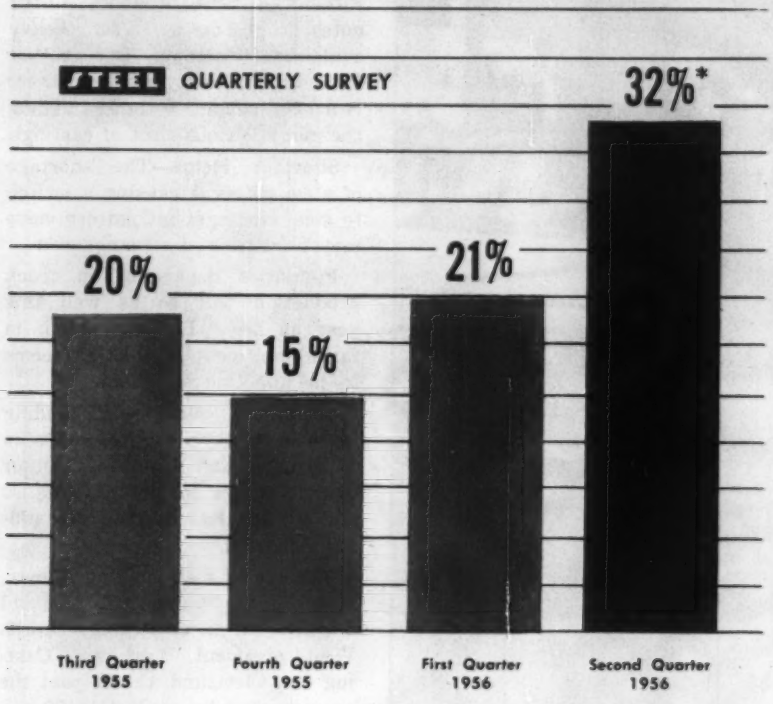
MODERNIZE WITH POTTER & JOHNSTON . . . REPLACE FOR PROFIT

Major Industrial Components

(% of respondents who added to inventories)



*Estimates of respondents

Survey includes: Bearings, castings, hose couplings, cylinders, electrical equipment, fasteners, forgings, gears, mechanical rubber goods, screw machine products, springs and wire shapes, stampings, weldments

Trend To Build Continues

Buyers around the nation are braced for higher prices. Shortages continue but higher over-all inventories are the trend. Many think they'll be better off in three months

STEEL CASTINGS are hard to find. They head the most-wanted lists of 20 per cent of the purchasing agents responding to STEEL's latest inventory survey.

A shortage of all castings (die, gray iron, malleable, nonferrous and steel) concerns one of three survey respondents. Other items giving plenty of delivery trouble are antifriction bearings, many kinds of electrical equipment and forgings.

Sixty per cent of the respondents are having trouble getting at least one of the major industrial components.

Consistent—STEEL's last survey (Jan. 9, page 39) reported 30 per cent of the buyers expected to build inventories in the first quarter of 1956. Expectations for the second quarter are up slightly to 32 per cent (see chart).

As it was a year ago (STEEL, Apr. 4, 1955, p. 35), the percentage of respondents building inventories in the first quarter rose to 21 per cent from a fourth quarter yearly low of 15 per cent.

Expectations for building inventories run about 10 percentage points above accomplishments; so the second quarter should see at least 20 per cent of the respondents with higher inventories, unless more critical shortages develop.

Higher Prices — The feeling is general that prices will continue to rise. Several buyers think this good reason to build inventories; expected hikes in steel prices this summer are being anticipated now.

A more hopeful view is expressed by a Clifton, N. J., buyer, who is accepting deliveries of components ahead of his steel supply "to avoid the rush if steel ever softens in supply."

Longer lead time also is creating a tendency to build inventories, although it's difficult to build if your current requirements are not being met, as is the case with 17 per cent of the respondents.

A Milwaukee purchasing agent reasons this way: "Components are comparatively inexpensive as far as the whole assembly is concerned, so larger inventories of smaller components are advantageous at this time."

Levels—The general level for all major industrial components is a 30-to-60-day supply. Exceptions to the rule are found among supplies of belting and hose couplings where 40 per cent of the respondents are carrying inventories in the 30-day-or-less category.

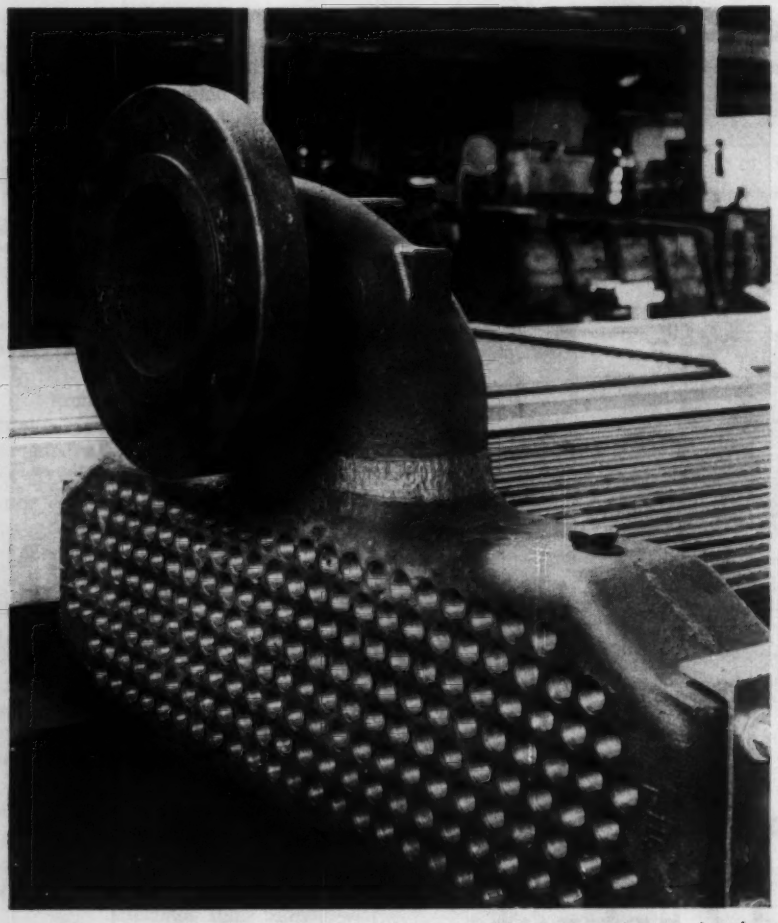
About 10 per cent of the buyers think their inventory positions are worse than they were three months ago; 23 per cent believe they have improved their positions.

Almost 45 per cent hope to improve their inventories in the next three months; only 5 per cent think they'll be worse off.

Minor Theme—Not all purchasing agents are plagued with shortages. Some have better supply lines than others; some have been buying for several months in anticipation of present and future shortages.

The minor theme of STEEL's survey is represented by the 16 per cent of respondents who expect to lower inventories in the next three months, and who think they'll be better off if they do it. Another 5 per cent expect lower inventories to maintain their present position, and at least 2 per cent fear higher inventories will worsen their position.

Better Off — Of those respondents planning to build, three of four believe they'll be better off three months from now. Geographically, this group is scattered.



Texas Electric welds two castings to make heat exchanger header

Steel Casting Sales Climb

A SALES INCREASE of 15 to 25 per cent is expected by the nation's steel foundries this year.

F. Kermit Donaldson, executive vice president, Steel Founders' Society of America, thinks shipments should run between 1.8 million and 1.9 million tons. He estimates member foundries will operate at 80 per cent of capacity. This is considered good for an industry that must maintain a big reserve for defense production.

Last year's marks indicate a firm base for this year's business. Production last year went up more than 60 per cent while unfilled orders more than doubled.

The trend is continuing. The society says new orders in February were 98.2 per cent of capacity, while March production is estimated at 86.8 per cent.

Market Shares—This year the railroads are leading the customer parade. One large Chicago foundry is running about 50 per cent stronger than last year because the railroad equipment field is so active.

The next largest share of casting production is going to makers of general machinery and valves and fittings.

C. L. Snowdon Jr., president, Reliance Steel Casting Co., Pittsburgh, says: "Expansion of steel mills and increasing demand for metalworking equipment are responsible for good sales."

Clyde L. Hassel, vice president, Pittsburgh Steel Foundry Corp., notes that demand for heavy equipment is strong. But another Pittsburgh foundryman says there is a poor balance in orders among the many various sizes of castings.

Shortage Helps—The shortage of steel plates is causing a switch to steel castings, but pattern costs may hold back the change-over.

Foundries depending on truck production will do as well this year as last. But the slump in farm implement production seems to be affecting suppliers.

Something New — Expanding markets for steel castings are seen in turbines and generators. Other new uses are in guided missiles and the lift slab method of building construction.

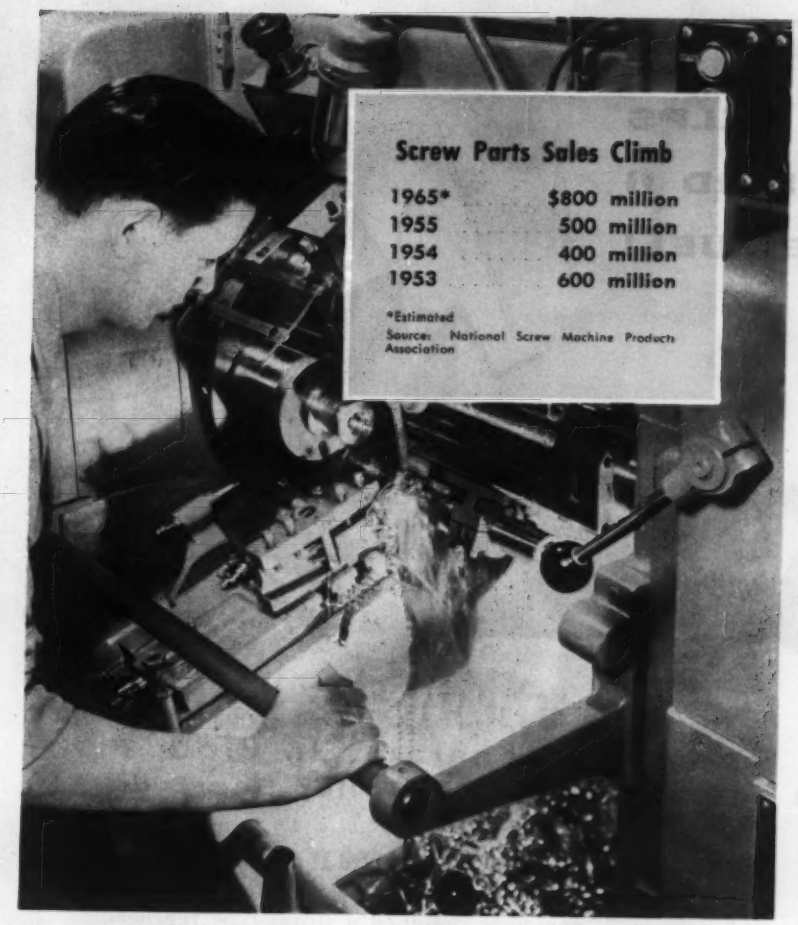
The use of shell molding (STEEL, Mar. 19, p. 97) bids to expand markets for steel castings. Ralph West, president, West Steel Casting Co., Cleveland, thinks that the process may be applied to 70 per cent of the castings weighing under 10 lb which need considerable machining.

Better sands and binders and improved molding machines get much credit for the improvement in casting properties. W. M. Ferguson, vice president, Texas Electric Steel Casting Co., Houston, says: "In our foundry we make castings to withstand pressures up to 15,000 psi. Ten years ago 5000 psi was high."

Meeting — Howard F. Park Jr., vice president, sales, General Steel Casting Corp., Granite City, Ill., was elected president, Steel Founders' Society of America, at the annual meeting in Chicago, Mar. 19-20.

George W. Myers, president, Crucible Steel Casting Co., division of Consolidated Foundries & Mfg. Corp., Milwaukee, was elected vice president; and Royal G. Parks, treasurer, National Malleable & Steel Casting Co., Cleveland, was re-elected treasurer.

Robert C. Wood, president, Minneapolis Electric Steel Casting Co., was awarded the T & O medal of the Steel Founders' Society at the annual meeting.



Warner & Swasey Co.

Planning for Expansion

HOW DO you boost your dollar volume by 50 per cent or more in ten years?

The National Screw Machine Products Association thinks the job shop screw products industry has a chance of doing $800 million in sales by 1965 (see table), a 60-per-cent increase from 1955, or probably about a 50-per-cent gain in physical volume when you allow for inflation that's likely to come.

Barnstorming—Top officers in the association, President Ernest W. Schneider and Executive Vice President Orrin B. Werntz, have been traveling among the members for the past year telling them that the goal can't be reached if the approach is like Topsy's. Says Mr. Werntz: "We have to plan our gains, or they won't come."

Here's one NSMPA suggestion to plan that growth: Set aside 8 cents of every sales dollar for the next ten years to modernize and expand. In 1947, the latest year for which figures are available, the industry spent only 5.9 cents per sales dollar for new and used equipment and new plant. Since then, the figure has probably not been much higher.

Earnings—In 1954 the industry averaged only 4 per cent in before-tax profits. If the companies that had losses that year were left out, the industry showed profits of only 8 per cent before taxes, 4 per cent after taxes. While the 1955 percentages are a little better, they're still not high enough to make it easy to find that 8 cents.

How it can be found will be a major topic at the industry's annual meeting in Milwaukee this week. A series of nine workshop sessions at the meeting will explore aspects of the problem. Also, NSMPA is working on a marketing research roundup to help with the question of modernization.

Three Areas — Experts think modernization in the screw products industry can be accomplished through:

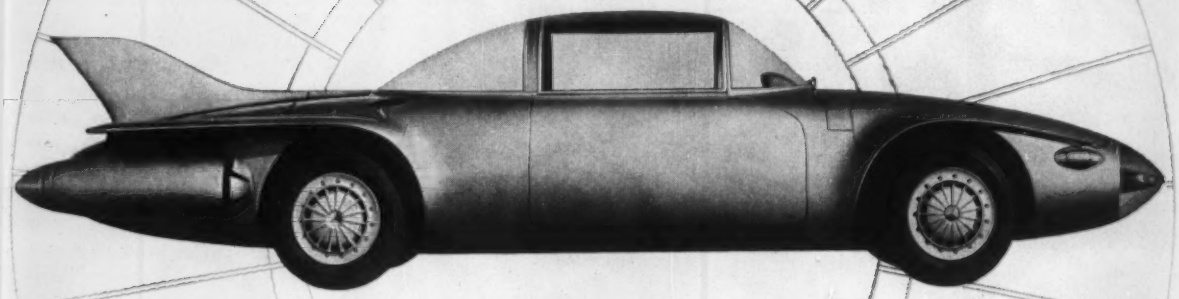
1. More and better training of administrative personnel, particularly the juniors who may be running the company in the 1960s. (Trade association seminars, college courses and business magazine articles should be used more.)
2. Closer attention to the problems of depreciation and re-equipment. (The Internal Revenue Service's liberalized depreciation rules can help, as can some of the newer scientific approaches to re-equipment policies. See STEEL, June 20, 1955, p. 99.)
3. A better profit ratio. (Needed to achieve this, among many things, are more economic selling, daily cost searching.)

Alternatives—What will happen to a company that doesn't choose to set aside 8 cents of every sales dollar for modernization and expansion? "There's no standing still in this or any industry," says Mr. Werntz. "You either move ahead or fall back or out. Too many companies in all component part industries don't seem to realize this."

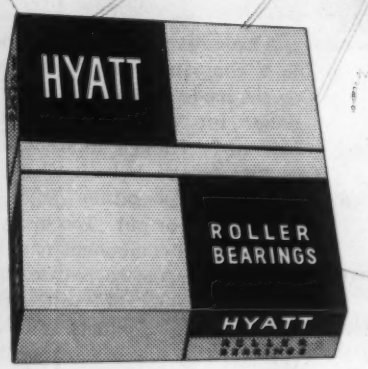
He says that the "fall out" rate in the screw products industry in the last two years has been higher than at any time in the past decade. In the industry now are some 500 commercial shops with 20 or more employees. More than 1000 shops exist with less than 20 workers. Mr. Werntz thinks that ten years from now there will be fewer companies, but bigger ones.

Will this revised industry of 1965 be equal to a volume of $800 million? It has been able to cope with growth thus far. Since 1929 its gross business has risen 328 per cent, compared with a rise in general consumer durables of only 155 per cent.

HYATT HELPS FIREBIRD II SAVE FUEL!



Unique regenerator operates in 1300° F exhaust on special HYATT Roller Bearings



To enable the Firebird II to operate almost as economically as a conventional car, GM engineers designed a drum-type regenerator which revolves through the gas turbine exhaust, recovers 80% of its 1300° F heat, and transfers it to the intake air.

No ordinary bearings, however, could handle this job. So HYATT designed special roller bearings which operate efficiently and dependably in this punishing service. Just as dependably as do the millions of HYATT taper bearings which are used in *nearly half the automobiles being built today!*

Remember, HYATT is America's *first* and *foremost* builder of roller bearings—a major source of supply for the automotive industry. Hyatt Bearings Division of General Motors, Harrison, New Jersey.

HYATT ROLLER BEARINGS

STRAIGHT | BARREL | TAPER

Auto men strive to control costs, heed customer demands in . . .

Juggling for Quality

BUILDING automobiles and trucks at a high level of quality is a juggling job, say the engineers and quality control people who discussed essential versus nonessential quality at a recent Society of Automotive Engineers meeting in Cleveland.

Determining which parts must hold to design specifications and which ones can be used even though they don't meet tolerances is a problem that starts with suppliers and continues right through manufacturing, inspection, servicing and even the customer.

Theory — It's easy to say that parts must be rejected or manufacturing operations changed if specifications by engineers aren't followed. But the problem isn't that simple. Too many persons have a finger in the pie.

Sales departments are interested in matching competition. Suppliers may accidentally or deliberately slip through low quality parts which have to be used. Engineers can't anticipate all the answers, and what one customer calls essential may be unimportant to another buyer.

Example — The result is that brake drums which are slightly out of balance might get by, but cylinder heads have to be exactly to tolerances. The next time, these conditions can be reversed. Deciding when specifications are essential or nonessential pits quality control sections against design engineers and gives the automakers plenty of problems.

Robert Kenney, assistant chief inspector, General Motors Truck Division, says: "You won't get into trouble with a customer if you know about errors or omissions. Customers complain about the mistakes you aren't aware of."

Guinea Pigs—The industry privately admits that sometimes the customer acts as an unwitting guinea pig when he discovers flaws in a vehicle. Other times, owners of truck and auto fleets are asked to co-operate with the manufacturers to find out how a vehicle really works.

In either case, when complaints come in, the engineers have to move quickly to correct mistakes. Here are some of the checks companies apply to insure the best possible quality in finished cars and trucks.

Suppliers—R. D. Long, chief inspector, Motor Truck Division of International Harvester Co., Chicago, points out three important factors in dealing with partsmakers.

1. A company must know and trust its suppliers. 2. In using a new supplier, check its products, methods and materials thoroughly. 3. Check suppliers periodically, not just at the beginning of a production run.

Usually, the first sample parts a supplier submits are accurate, but as production continues, periodic sampling often shows up some which do not meet specifications. This isn't always controllable by a supplier. Changes in material, tooling wear and lax inspection can lower quality without a manufacturer realizing it.

Manufacturing — Design, sales and marketing all influence quality. Engineers can design for almost any quality level that's wanted. The problem is how to arrive at a level which can be maintained profitably.

One expert says that when a company puts defects amounting to 0.5 per cent in a customer's hands, it's in trouble. That's a good goal, but most quality control men suspect that the figure is closer to 5 per cent.

Problems — Competition often upsets quality levels during production runs. One manufacturer, for example, designed the cheapest transmission possible to meet customer requests. After production started, the sales department pointed out that a competitor was winning the sales race because it offered a smoother shift. Redesigning was expensive, and inspectors had to revise quality levels to approve the new transmission.

F. F. Galbos, quality control director, White Motor Co., Cleveland, suggests that an inspection planning department is needed to determine what essential qualities must be maintained in each part and in each manufacturing operation. This department should include sales, engineering, manufac-

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turing and quality control personnel.

Happy Medium — Inspectors would like to create one set of standards for an average or ideal customer. They admit it's practically impossible. The finish on a car is important to one buyer, but another customer wants to be sure the windows don't stick. The owner of a truck fleet reports that he pays more per mile to maintain windshield wipers than he does to service transmissions.

This is where service departments or dealers play an important part. Often, the dealer has the final responsibility to see that the customer gets the kind of quality he wants. This is particularly true of truck manufacturers; slightly less so for automobiles.

Service — Mr. Kenney reports that GMC's Truck Division set up its own customer service department for buyers who pick up trucks at the plant. GM Truck found that it had to take over dealer service problems. It also discovered that this was a good way to find out what the customer wants.

In controlling quality at the service or dealer level, three points stand out:

1. Service tests must be up to date. An inspector explained that a customer found a loose bolt on one truck two years ago. The service department still checks that bolt on all models today even though it's unnecessary.

2. Emphasize seasonal checks. In summer months, for example, it is important to check for vapor locks.

3. Be sure that the service department or dealer doesn't make checks that can be made at less cost by the factory.

Machinability—Even though a part or manufacturing process may be falling below an acceptable quality level, it's often difficult to correct because management won't buy tools to build the part to proper specifications.

White Motor Co. solves this problem with its ECR (Engineering Change Request) committee. This group is composed of men from all phases of sales, manufacturing, engineering and inspection. It reviews requests for machine changes to see if quality levels will be improved and if costs can be met.

Standards—Even this brief summary shows that controlling quality is a many-sided problem. Pilot production runs, proving ground tests and customer surveys don't answer all the questions.

Safety, costs and personal experience are yardsticks by which most inspectors judge whether a unit should be accepted or rejected. Quality control departments are happy if they can please most of the people most of the time.

GM To Build in California

General Motors Corp., Detroit, soon will start building an assembly plant in the San Francisco-Oakland bay area.

Harlow H. Curtice, GM president, says he expects the plant will be ready to produce 1958 Buick, Oldsmobile and Pontiac cars. It will cover 1.5 million sq ft and will have a total employment of about 5000. Normal productive capacity is rated at 100,000 cars a year.

The California market accounted for 9.3 per cent of GM's new car sales last year, compared with 7.6 per cent in 1954.

U. S. Auto Output

Passenger Only

	1956	1955
January	611,190	659,508
February	554,667†	675,769
March		794,188
April		754,007
May		724,891
June		649,372
July		659,979
August		614,392
September		461,592
October		517,669
November		748,559
December		682,698
Total		7,933,369

Week Ended	1956	1955
Feb. 25	125,502	171,188
Mar. 3	132,889	167,811
Mar. 10	132,840	171,346
Mar. 17	131,207	176,194
Mar. 24	130,866†	178,068
Mar. 31	132,000*	177,295

Source: *Ward's Automotive Reports*
†Preliminary *Estimated by STEEL

Chrysler Tests Turbine Car

Chrysler Corp., Detroit, reports that its engineers are driving a turbine powered automobile from New York to Los Angeles.

The car, a four-door 1956 Plymouth sedan, left New York last Monday (Mar. 26). James C. Zeder, engineering vice president, says: "The results of this road test will provide us with additional insight into the potentialities of the gas turbine as a new source of power."

Mr. Zeder emphasizes that the development of less expensive nonstrategic materials for turbine wheels and blades, plus better manufacturing methods, are among the problems to be solved before gas turbine engines can be produced in quantity.

Exhaust Notes

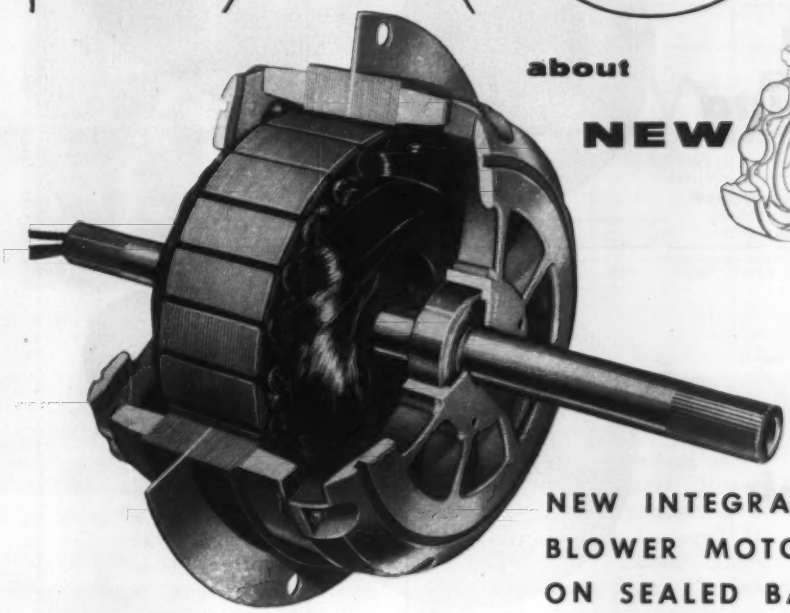
Studebaker-Packard Corp., Detroit, says that gold anodized aluminum grilles have been standard equipment on all of its Packard cars since Mar. 5 . . . . GM reports that its Electro-Motive Division uses apricot pits to clean traction motor armature cores. . . . Copco Steel & Engineering Co., Detroit, has announced that it will enter the truck-trailer field with an all-aluminum model. Trailers will be made in a Copco plant near Centerline, Mich. If sales go well, the company plans to expand to plants in South Bend, Ind., and Detroit. . . . Edward T. Ragsdale, general manager of GM's Buick division says that auto buyers are trending toward lower priced lines. He points out that sales of the low-priced Buick Special are running around 56 to 57 per cent of production, compared with about 53 per cent in 1955. Buick dealers delivered 18,441 cars the first ten days of March. That's 6 per cent more than in the previous period. . . . Chrysler Corp. took 18 per cent of the domestic new car market in the last ten days of February. Sales for that month were 14 per cent higher than January, 1956.

FACTS

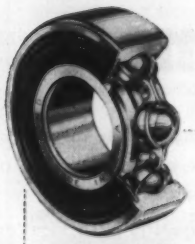
about

NEW DEPARTURE

BALL BEARINGS



NEW INTEGRAL-DRIVE BLOWER MOTOR DEPENDS ON SEALED BALL BEARINGS!



5 advantages of New Departure's Sentri-Seal ball bearings in electric motor applications

- **SEALED AND LUBRICATED FOR LIFE!** No need for relubrication; no danger of over- or under-lubrication.
- **SIMPLIFY DESIGN!** Eliminate need for separate seals and grease fittings.
- **CARRY LOADS IN ANY POSITION!** Moving parts are held in positive alignment, regardless of motor mounting position.
- **WEAR IS NEGLIGIBLE!** Require no attention for adjustment for wear. Have a reputation for outlasting the products they serve.
- **QUIET-RUNNING!** New Departure ball bearings are precision-made, run smoothly. Their uniformity is a guarantee of dependability.

Nowhere is the superiority of New Departure sealed ball bearings in electric motor applications better exemplified than in this new integral-drive blower motor.

Revolutionary "inside-out" design of this new motor imposed a lubrication problem solved by the permanent-lubrication characteristic of the finest sealed ball bearings. In this motor, the rotating element, to which the blower wheel is attached, is on the outside and revolves around a stationary shaft through which the lead wires pass. "Sealed and lubricated-for-life" New Departure ball bearings were selected because they assure permanent lubrication, regardless of centrifugal force. Also, because motor and blower wheel share the same permanently lubricated bearings, this integral unit is free of the need for periodic servicing.

Equally important, New Departure sealed ball bearings handle combination loads in any position . . . assure positive alignment of rotor and stator. This means a versatility of application for this motor that offers new freedom to designers.

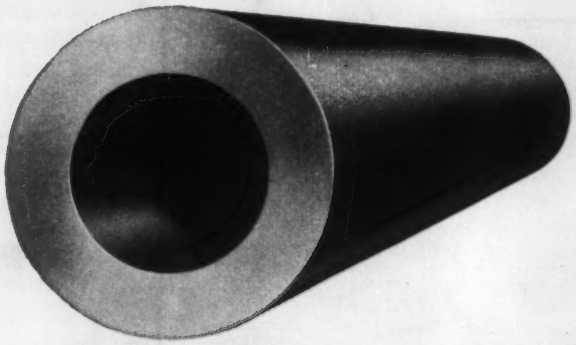
Sealed ball bearings also help increase motor efficiency and reduce electrical hum. Since in ball bearings wear is so slight as to be entirely negligible, designers were able to build in a smaller precision air gap, which is maintained throughout motor life.

Let New Departure's unexcelled engineering service show you the many advantages of sealed ball bearings in electric motor and other applications.

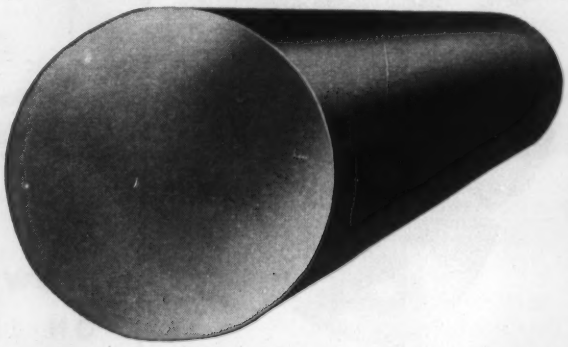
NEW DEPARTURE • DIVISION OF GENERAL MOTORS • BRISTOL, CONN.

When you make hollow parts . . .

Start with seamless tubing



instead of bar stock



Save steel, machining time!

WHEN you make hollow parts from bar stock, you waste time boring the center hole—you waste steel because you have to throw away the chips you bore out. Why not do it the easy, economical way? Start with Timken® seamless tubing. The hole's already there! Finish boring is often the first production step. You cut machining time—get more parts per ton of steel.

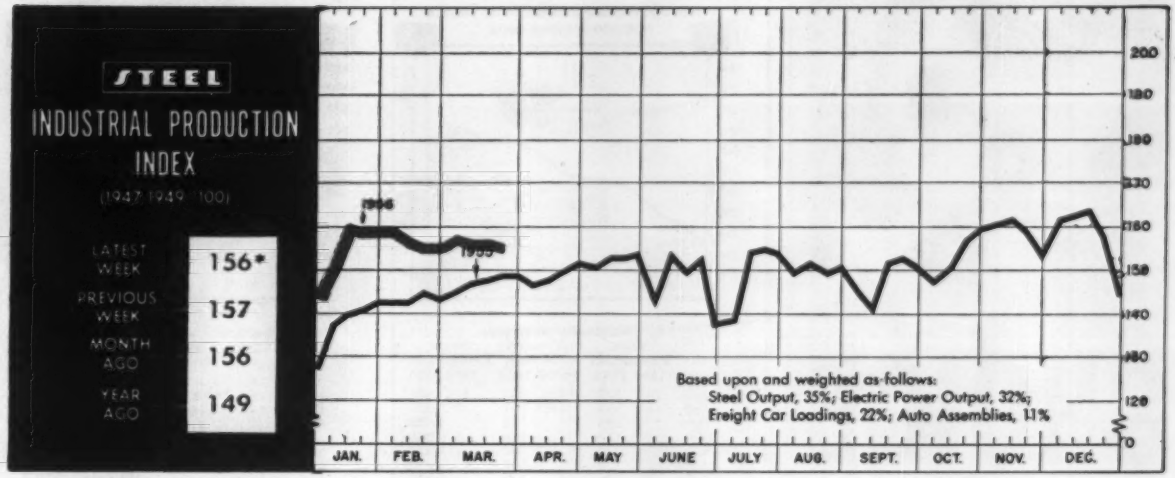
With Timken seamless tubing, your machine tools are more productive. Screw machine stations normally used for drilling can be released for other jobs. You get added machine capacity without additional machines.

To make sure you save even *more* steel, our engineers will study your problem and recommend the most economical tube size for your hollow parts job, guaranteed to clean up to finish dimensions.

You also get the highest internal quality with Timken seamless tubing. The piercing process by which it's made is basically a forging process. Result: a uniform spiral grain flow for greater strength and a refined grain structure which brings out the best quality of the metal. And the Timken Company's rigid control keeps the quality uniform from tube to tube and heat to heat. The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".

YEARS AHEAD—THROUGH EXPERIENCE AND RESEARCH

SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS TUBING



*Week ended Mar. 24

High Plateau of Late '55 To Continue

"THE NATION'S business activity, still in the leveling-off process, will continue for the next few months at the high plateau reached late in 1955," says George Hitchings, Ford Motor Co. economist.

Mr. Hitchings' statement typifies the stand being taken by more and more businessmen as 1956 passes into the second quarter. And there is firm foundation for this prognostication. The Ford spokesman says there are three main reasons for this "sidewise movement." Primary metal industries can't go much higher because they are "bumping against production capacity ceilings." Demand for new cars and housing has undergone a moderate slowdown, and production of cars for inventory build-up has stopped.

The Key—But nonautomotive inventories hold the key to business activity for the second half, Mr. Hitchings believes. They probably will continue to rise during the first half because of good sales volume and uncertainty regarding the upcoming steel industry wage negotiations. Consumer demand, business investment other than inventories and government purchases probably will remain at current levels or higher during the second half, he says, unless employment and income are cut back because of high stocks of goods.

This sidewise movement is evident in the Federal Reserve Board's industrial production index, which held to January's 143 (1947-1949=100) during February. (See chart, page 72.) And the March report of the National Association of Purchasing Agents indicates it will continue that way. On production, 33 per cent of the respondents (against 32 per cent for February) reported an increase. Thirty-three per cent reported better new order positions, compared with only 30 per cent in February. There was a decrease of 1 per cent in those reporting fewer orders. Employment is increasing, with expected improvement in this area later this spring.

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	2,400[1]	2,449	2,278
Electric Power Distributed (million kw-hr)	11,200[1]	11,202	9,907
Bitum. Coal Output (1000 tons)	9,240[1]	9,525	8,058
Petroleum Production (daily avg—1000 bbl)	7,150[1]	7,153	6,863
Construction Volume (*ENR*—millions)	$501.3	$648.9	$544.8
Auto, Truck Output, U. S., Canada (*Ward's*)	167,612[1]	167,014	217,347
TRADE			
Freight Car Loadings (1000 cars)	690[1]	686	639
Business Failures (Dun & Bradstreet)	290[1]	300	232
Currency in Circulation (millions)[3]	$30,264	$30,276	$29,719
Dept. Store Sales (changes from year ago)[4]	−2%	+7%	+14%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$24,010	$20,715	$22,095
Federal Gross Debt (billions)	$277.7	$279.9	$274.3
Bond Volume, NYSE (millions)	$22.4	$29.0	$14.6
Stocks Sales, NYSE (thousands of shares)	14,088	15,428	12,378
Loans and Investments (billions)[4]	$85.3	$84.3	$84.9
U. S. Govt. Obligations Held (billions)[4]	$28.4	$28.2	$34.3
PRICES			
STEEL's Finished Steel Price Index[5]	209.10	209.10	194.53
STEEL's Nonferrous Metal Price Index[6]	285.3	286.0	227.4
All Commodities[7]	112.8	112.5	110.1
Commodities Other Than Farm & Foods[7]	120.7	120.6	115.5

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1956, 2,461,893; 1955, 2,413,278. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100

CHOICE

Take yours—

from the complete line of

JOMAC WORK GLOVES

Whatever your handling operations may be, you can choose with confidence the Jomac Gloves that are right for them. And you can be sure of getting quality—lasting quality, stemming from 18 years of pioneering and leadership in the industrial work glove field.

Jomac Work Gloves are:

- made of cut-resistant, loop-pile Jomac Cloth—the fabric that protects hands from cuts and abrasion like no other
- manufactured in knit wrist, safety cuff or gauntlet styles—in heat-resistant, flame-proof, plastic-coated types
- great for economy—can be used, cleaned or reconditioned, and reused again and again
- adaptable—many styles are interchangeable, with *4* long-wearing surfaces per pair
- rugged—*they outwear canvas gloves by a profitable margin!*

Jomac manufactures all types of hand-to-shoulder protection. The choice is yours.

FREE JOMAC CATALOG

Write us (on your company letterhead) for your free Jomac Industrial Work Gloves Catalog—and for recommendations on types of gloves to use for your handling operations. We'll gladly supply sample gloves. Address: Jomac Inc., Dept. E, Phila. 38, Pa.

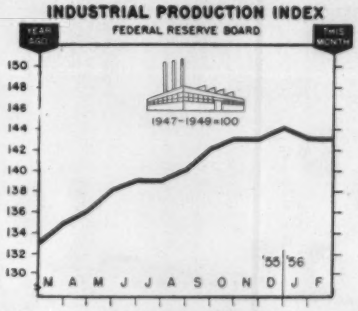
JOMAC

INDUSTRIAL WORK GLOVES

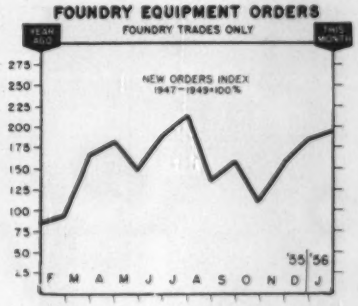
PLANTS IN PHILADELPHIA, PA., AND WARSAW, IND.
IN CANADA: SAFETY SUPPLY CO., TORONTO

THE BUSINESS TREND

INDUSTRIAL PRODUCTION INDEX
FEDERAL RESERVE BOARD



FOUNDRY EQUIPMENT ORDERS
FOUNDRY TRADES ONLY



(seasonally adjusted)

	Total Production		Primary Metals		Metal Fabricating	
	1956	1955	1956	1955	1956	1955
Jan.	143	132	150	127	170	157
Feb.	143*	133	149*	131	169*	157
Mar.	...	135	...	135	...	158
Apr.	...	136	...	138	...	160
May	...	138	...	140	...	162
June	...	139	...	143	...	163
July	...	139	...	134	...	167
Aug.	...	140	...	139	...	170
Sept.	...	142	...	146	...	171
Oct.	...	143	...	148	...	173
Nov.	...	143	...	149	...	172
Dec.	...	144	...	151	...	172
Avg.	...	138	...	140	...	165

Federal Reserve Board. *Preliminary
Charts copyrighted, 1956, STEEL.

	1956	1955	1954
Jan.	195.8	81.0	173.8
Feb.	....	90.4	99.9
Mar.	....	163.6	82.7
Apr.	....	178.6	125.3
May	....	145.7	80.8
June	....	186.8	86.4
July	....	213.4	68.8
Aug.	....	134.0	75.6
Sept.	....	156.7	68.3
Oct.	....	108.6	147.5
Nov.	....	154.4	61.4
Dec.	....	183.9	113.9

Foundry Equipment Mfrs. Assn.

The survey also shows an uptrend in industrial materials prices.

Special Question — Demand for consumer durables is holding its own, said 54 per cent of the respondents to the NAPA survey, while 37 per cent said it is slipping. Nine per cent see an improvement here. It is significant that many of the members expect an increase in the third and fourth quarters.

That the consumer is in a favorable position to spend is evident: The cost of living in mid-February was unchanged from the month earlier. At the same time, the Bureau of Labor Statistics states that the average weekly take-home pay of factory workers was at a record level for February. Estimated weekly earnings were about $2.90 higher on a year-to-year basis, and about equal to the January pay envelope. In addition, the Office of Business Economics says that corporations issuing public reports paid out $809 million in dividends in January, about 12 per cent more than in January, 1955. Bank clearings for 26 leading cities reached the highest point this year —over $24 billion, says Dun & Bradstreet Inc.—indicating that a good portion of this increased buying power is being used.

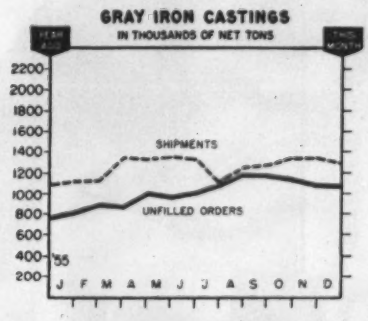
First Quarter Sets the Pace

Companies reporting on first-quarter business bespeak confidence in 1956 as another tremendous year. New York Air Brake Co. expects first-quarter earnings to be at the level they were in the fourth quarter last year. New bookings are running 19 per cent ahead of those a year ago. Sales of Crane Co. for the first two months of 1956 were 20 per cent ahead of the corresponding 1955 period, and the company anticipates it will operate at capacity for the rest of the year. "Profits will be substantially more for the first six months this year than for the period in 1955," said Frank F. Elliott, president.

U. S. Industries Inc. expects its sales this year to reach $125 million, compared with a record of $81.3 million last year.

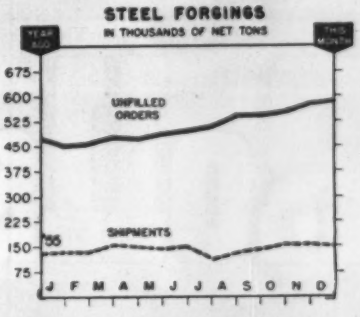
New Order Position Holds Up

New orders for industrial goods fortify the business optimist. American Supply & Machinery Manufacturers' Association Inc. reports February bookings up 1.7 per cent over the January level to 195.88 (July, 1948 = 100). This is the second-highest recording since April,



	Shipments 1955	Shipments 1954	Unfilled Orders* 1955	Unfilled Orders* 1954
Jan.	1,092	932	782	872
Feb.	1,106	986	852	865
Mar.	1,315	1,047	842	842
Apr.	1,294	996	986	826
May	1,310	943	938	775
June	1,296	987	982	804
July	1,070	821	1,050	829
Aug.	1,226	935	1,160	830
Sept.	1,253	921	1,151	811
Oct.	1,310	942	1,113	789
Nov.	1,306	997	1,082	760
Dec.	1,260	1,074	1,075	745
Total	14,838	11,530		

*For Sale. U. S. Bureau of the Census



	Shipments 1955	Shipments 1954	Unfilled Orders 1955	Unfilled Orders 1954
Jan.	136	139	453	638
Feb.	135	127	460	539
Mar.	154	130	479	487
Apr.	150	116	475	460
May	147	107	488	431
June	156	113	501	409
July	115	97	513	395
Aug.	135	102	547	410
Sept.	149	109	552	409
Oct.	158	113	560	382
Nov.	158	120	585	461
Dec.	158	129	592	473

U. S. Bureau of the Census. Data based on reports from commercial and captive forge plants with monthly shipments of 50 tons or more

1951. The Industrial Heating Equipment Association Inc. says orders for industrial furnaces totaled $12,162,877 during February. This betters any month in 1955, discounting June and December when steel mill furnace orders were included. Foundry equipment orders in January moved to second place within the last 12 months when they registered 195.6 per cent of the 1947-1949 base period (see chart on page 72).

Machine tool builders are sailing along on a backlog equivalent to 8½-months of production at current rates. The February report of the National Machine Tool Builders' Association shows that the industry shipped $64.6 million worth of tools, second only to December within the last year. Builders are confident that new orders, which slipped to $86 million in February, will continue to replenish their books.

Incorporations Hit Peak

One blot on the record is business failures. Dun & Bradstreet reports a new weekly postwar record of 300 failures for the week ended Mar. 15. The firm also says February saw 1024 businesses fold, the worst such month since 1941. The total was slightly below the January report, however. One reason cited by some economists for the heavy toll is the advance in the cost of industrial goods without compensating increases in the cost of the end product to the consumer. For this reason, failures may continue to be a sore spot.

Counterbalancing this trend is the increase in new incorporations. D&B says that 12,503 new charters were issued in February, compared with 11,369 in February, 1955. New business formations for the first two months of 1956 set an all-time high for that period at 25,866.

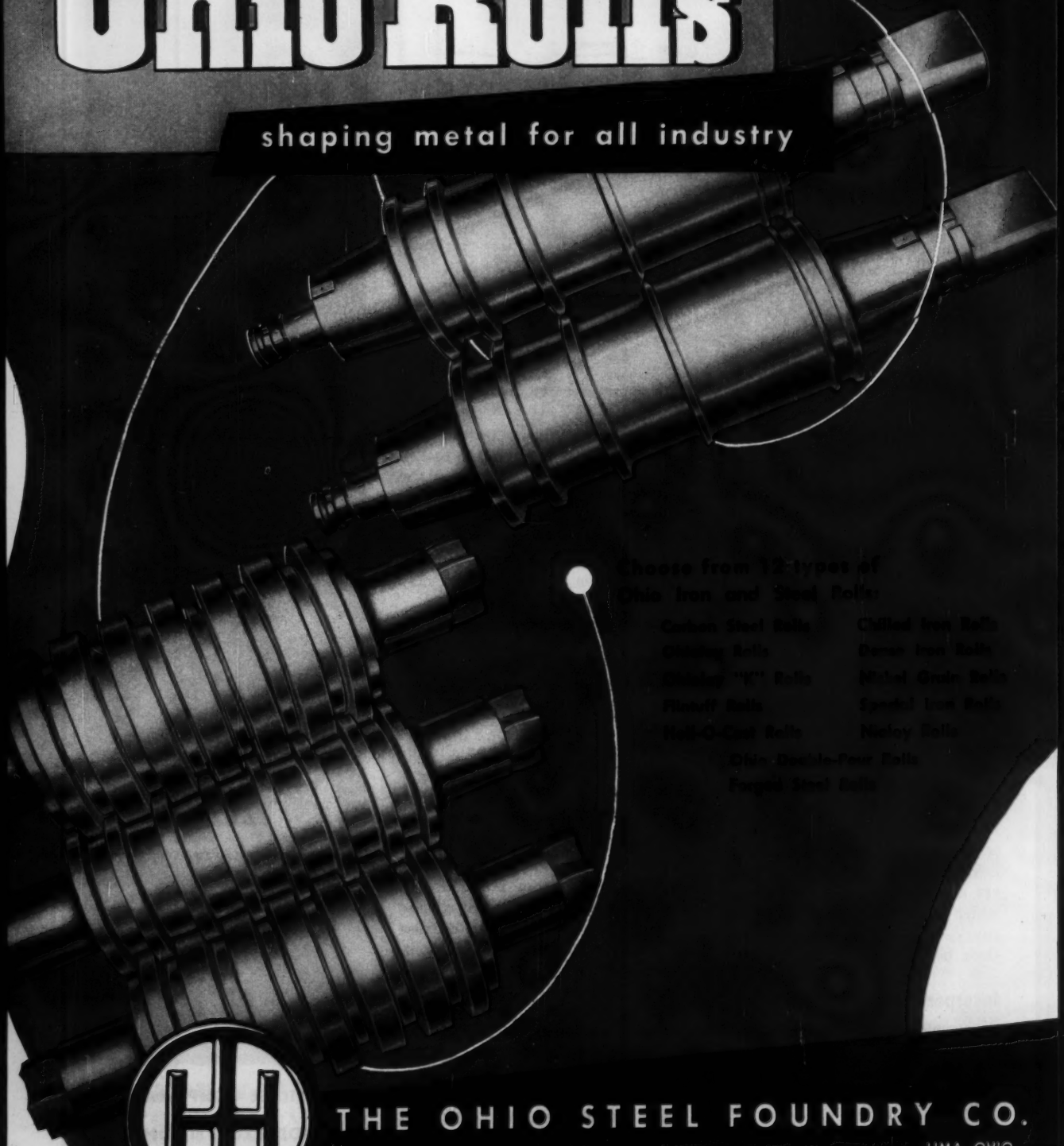
Trends Fore and Aft

Owen Clarke, member of the Interstate Commerce Commission, says that nationwide production of new freight cars is running at less than half of shop capacity because of steel shortages. Most mill products are in tight supply even though the nation's steel mills are running close to capacity.

Total construction this year may exceed last year by 5 per cent or more, Robinson Newcomb, Robinson Newcomb Associates, told a meeting of the National Industrial Conference Board last month in Atlanta.

Ohio Rolls

shaping metal for all industry



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LIMA, OHIO

Plants at Lima and Springfield, Ohio

JAMES M. PHILLIPS
. . . Salem-Brosius v. p.-engineering

James M. Phillips was elected vice president-engineering of **Salem-Brosius Inc.**, Pittsburgh. He was chief engineer.

Herbert G. Dillon and **George W. Bartlett** were elected vice presidents of **McKiernan-Terry Corp.**, Dover, N. J. Both are associated with the Mead-Morrison Division. Mr. Dillon, who joined the company in 1954, is in charge of sales. Mr. Bartlett, with McKiernan-Terry since 1948, is in charge of engineering. **A. F. Wilson** was named works manager of the Harrison, N. J., plant and **Frank W. Hamilton** of the Dover plant.

Hanson-Van Winkle-Munning Co. appointed **M. A. Tardiff** manager, general equipment sales, for its J. C. Miller Division, Grand Rapids, Mich. **P. C. Burnham** was made conveyor sales engineer for the division.

P. J. Sullivan, vice president of **Arrow-Hart & Hegeman Electric Co.**, Hartford, Conn., was appointed executive vice president.

Norman E. Nelson was elected president of **Newton Co.**, Manchester, Conn.

Chicago Steel Tank Co., Chicago, named **George M. Sanders** general superintendent. He is in charge of manufacturing for U. S. Industries Inc., subsidiary.

VINCENT L. BRADFORD
. . . Milford Rivet executive v. p.

Vincent L. Bradford, vice president-sales for **Milford Rivet & Machine Co.**, Milford, Conn., was elected executive vice president.

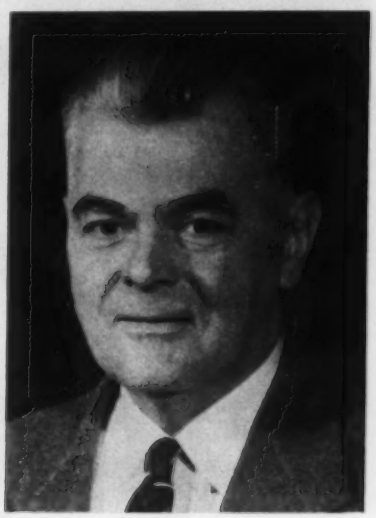
Hugo W. Biskeborn was appointed chief engineer of **Ansonia Wire & Cable Co.**, Ansonia, Conn. **Victor Siegfried** was made power cable engineer.

Harley Erickson was made production manager, **Eutectic Welding Alloys Corp.**, Flushing, N. Y.

S. E. Flenner was made product manager, washing machine parts, at **Ingersoll Products Division**, Borg-Warner Corp., Chicago. He joined Ingersoll last November. He was sales manager of Alloy Precision Castings Co., Cleveland.

Jesse L. Powers was made general manufacturing manager of **Buick Motor Division**, General Motors Corp., Flint, Mich. Former assistant general manufacturing manager, he succeeds **Edward T. Ragsdale**, now general manager of Buick. **Donald F. Taylor** becomes assistant general manufacturing manager and **Joseph J. Schweinfurt** was made general superintendent of all plants.

John F. Kovanda was made midwest district administrative manager at **Cherry-Burrell Corp.**, Chicago. **Ralph N. Baker** was made sales manager for the district.



JOSEPH ROSECKY
. . . B-L-H v. p.-Eddystone plant

Joseph Rosecky was promoted to vice president in charge of the Eddystone, Pa., plant of **Baldwin-Lima-Hamilton Corp.** He was manager of manufacturing for the Eddystone operations.

John E. McGrath was promoted by **American Steel & Wire Division**, U. S. Steel Corp., to assistant sales manager. He transfers from Cleveland to Kansas City, Mo. Formerly manager, market development division, he is succeeded by **James K. Sedgwick**. **John T. Jung** replaces Mr. Sedgwick as assistant manager, merchant products sales.

Harold F. Miller was appointed an assistant general manager of the Bethlehem, Pa., plant of **Bethlehem Steel Co.** He is succeeded as fuel engineer by **Thomas J. Law Jr.**

Maxwell P. Williams, formerly purchasing agent for **Willys Motors Inc.**, was appointed purchasing agent for the Cincinnati plant of Trailmobile Inc.

Jerome H. Frankle Jr. was named a vice president of **Metal Products Co.**, Niles, O. He will be in charge of the metal stamping division.

Edward S. Reddig, resigned executive vice president of White Motor Co., was elected president of **White Sewing Machine Co.**, Cleveland. He succeeds **G. G. Nuss** who

PARK Q. WRAY JR.
. . . National Motor Bearing v. p.-sales

JACK BRADT
. . . Howe Scale truck div. sales mgr.

AUSTIN KUHNS
. . . Farrel-Birmingham senior v. p.

was made executive vice president, sewing machine division.

Park Q. Wray Jr. was elected vice president-sales at **National Motor Bearing Co. Inc.**, Redwood City, Calif. He was general sales manager.

B. F. Ostergren Jr. was made sales manager, home heater division, **Siegler Corp.**, with headquarters in Chicago. He was southeast district manager. **R. W. Schmitt** was made assistant sales manager at Chicago.

Lamson Mobilift Corp., Portland, Oreg., promoted **Ivan E. Howard** from district manager of the Cleveland regional office to general service manager.

Donald Culver was named to head the sales division of **Murray Corp.**, Towson, Md.

James H. Bly joined the sales division of **High Voltage Engineering Corp.**, Cambridge, Mass. He was division manager at X-Ray Inc., Detroit.

Norman F. Burdette was named manager of a newly established Dallas branch office of **Baker-Raulang Co.**

R. K. Hendricks, purchasing agent for Miller Products Co., Des Moines, Iowa, was appointed area sales representative for **Interstate Steel Co.**, Evanston, Ill. He will work out of offices in Des Moines.

Jack Bradt was made sales manager, truck division, **Howe Scale Co.**, Rutland, Vt. He was associated with Safety Car Heating & Lighting Co. Inc. which, in January, acquired Howe Scale. Mr. Bradt was doing market research and development work as part of Safety company's expansion program.

T. B. Daniels, Chicago warehouse manager, **Jones & Laughlin Steel Corp.**, was appointed assistant to the warehouse division vice president.

Robert B. Connell was made sales manager, central district, **Titanium Metals Corp. of America**, with offices in Chicago.

C. Foster Harry was named general manager of **Maxim Silencer Co.**, subsidiary of Emhart Mfg. Co. at Hartford, Conn.

William B. Shimer was made chief industrial engineer for **De Soto Division** of Chrysler Corp., Detroit.

At the newly created industrial sales division of **National Supply Co.** at Toledo, O., **Carl W. Palmer** was named sales supervisor; **James L. Glidden**, sales engineer; and **Robert R. Sloan Jr.**, sales representative.

Samuel S. Whiteley Jr. was named to the new post of assistant sales manager at **Hunter Spring Co.**, Lansdale, Pa. He rejoins the company after three years with Faultless Caster Co.

Farrel-Birmingham Co. Inc., Ansonia, Conn., elected **Austin Kuhns** senior vice president. He has served as vice president and chairman of the company's finance committee since 1946. Mr. Kuhns, at present, directs the company's program of production for the atomic energy industry and the research department.

J. O. Phillips was named sales assistant to the president of **Heppenstall Co.**, Pittsburgh. **Dr. Robert B. Corbett** was named technical assistant to the president.

Arthur C. Treece was made general manager of **General Electric Co.'s** plastic department. Headquarters for the department has been moved from Pittsfield, Mass., to Decatur, Ill.

H. E. Hanley was made sales engineer and assistant to the Chicago district manager of **Transue & Williams Steel Forging Corp.**

Chas. A. Strelinger Co., Detroit, elevated **Charles T. Bush** to chairman, a new post. He continues as chief executive officer, and is succeeded as president by **V. Lee Edwards**. Other officers are **A. Stansell T. Bush** and **John N. Failing**, vice presidents.

Herbert I. Segal was elected president of **Van Norman Industries Inc.**, Springfield, Mass. He is also chairman of Hasco Machinery Co.

L. Robert Clinton was made pur-

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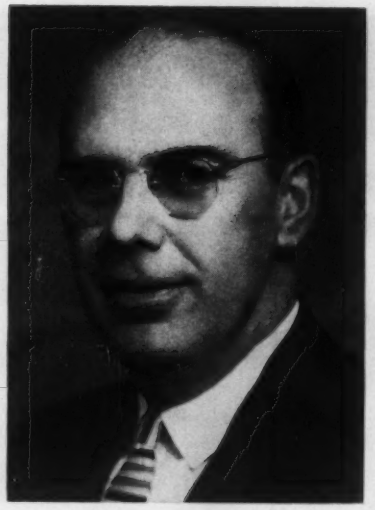
GEORGE W. BLACKMORE
. . . gen. mgr. of Heppenstall div.



THOMAS K. GRAHAM
. . . Raritan Copper Works manager

BRUNO LEONELLI
. . . vice president of Wagner Bros.

chasing agent for **National Vulcanized Fibre Co.**, Wilmington, Del.

George W. Blackmore was made general manager of **Heppenstall Co.'s** materials handling division at New Brighton, Pa. He was owner of Automatic Gas Equipment Co. which he formed in 1922.

Robert M. Pfaff was elected vice president and assistant general manager of **Conveyor Systems Inc.**, Chicago.

Norman T. Landry was made controller and **Percy C. Castle** assistant secretary and assistant treasurer of **Midland Steel Products Co.**, Detroit.

Jarrell-Ash Co., Newtonville, Mass., appointed **John Schuch** general sales manager.

Thomas K. Graham was appointed manager, **Raritan Copper Works**, International Smelting & Refining Co., at Perth Amboy, N. J., to succeed **Lorin W. Kemp**, retired. Mr. Graham has been superintendent of the Great Falls, Mont., Reduction Works, Anaconda Co.

Carl J. Murray was made works manager of the Buffalo plant of Colorado Fuel & Iron Corp.'s **Wickwire Spencer Steel Division.** He has been associated with Jessop Steel Co. in Washington, Pa., Crucible Steel Co. in Syracuse, N. Y., and Lamson Co. in Syracuse.

Herman F. Kaiser was made superintendent of the blooming mill at **Republic Steel Corp.'s** Canton, O., steel plant. He succeeds the late **Ben C. Wells.**

Bruno Leonelli was elected vice president, **Wagner Bros. Inc.**, Detroit. He continues to head up product and process development activities.

E. A. Channer was elected vice president of **H. M. Harper Co.**, Morton Grove, Ill. He was made general sales manager in 1953 and continues in this capacity as vice president-sales.

W. A. Richards Jr. was elected vice president and **G. L. May** was made vice president-general manager at **Micro Products Co.**, Chicago.

Arthur F. Giesecke was made manager of purchases by **Welding Fittings Corp.**, New Castle, Pa. He was senior buyer in the procurement department of Koppers Co. Inc.

OBITUARIES . . .

Louis H. Klein, production manager, **Browning Locomotive Crane Division**, Wellman Engineering Co., Cleveland, died Mar. 18.

T. E. Woodruff, manager, pump sales division, **Fairbanks, Morse & Co.**, Chicago, died Feb. 26.

Curtis A. Gordon, 60, works manager at **Colorado Fuel & Iron Corp.'s** plant at Claymont, Del., died Mar. 17.

Alexander J. Manning, 55, vice president and chief engineer, **Production Engineering Corp.**, San Diego, Calif., died Mar. 14.

Everett H. Clark, 55, vice president of **International Packings Corp.**, Bristol, N. H., died Mar. 20.

David Davis, 65, treasurer, **Perfection Gear Co.**, Harvey, Ill., died Mar. 21.

Martin Rothschild, 60, president, **Interstate Smelting & Refining Co. Inc.**, Chicago, died Mar. 19.

C. A. Albers, secretary-treasurer, **Globe Stamping Division**, Hupp Corp., Cleveland, died Mar. 24.

Walter E. Kent, 63, manager, industrial welding division, **Metalweld Inc.**, Philadelphia, died Mar. 12.

Melvin E. Murphy, 59, vice president, eastern operations, **National-Standard Co.**, Worcester, Mass., died Mar. 21.

John W. Prusheik, 53, owner, **South Side Die & Tool Co.**, Milwaukee, died Mar. 14.

Jacob Rosen, 74, founder of **Buffalo Sashweight & Foundry Co.**, Buffalo, died Mar. 19.

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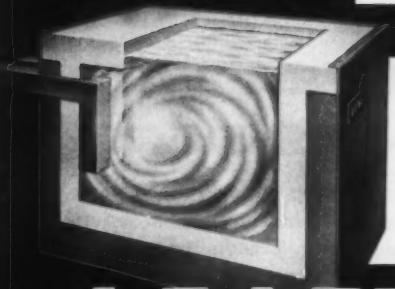

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Ajax Engineering Corp., Trenton, N. J. \ induction furnaces

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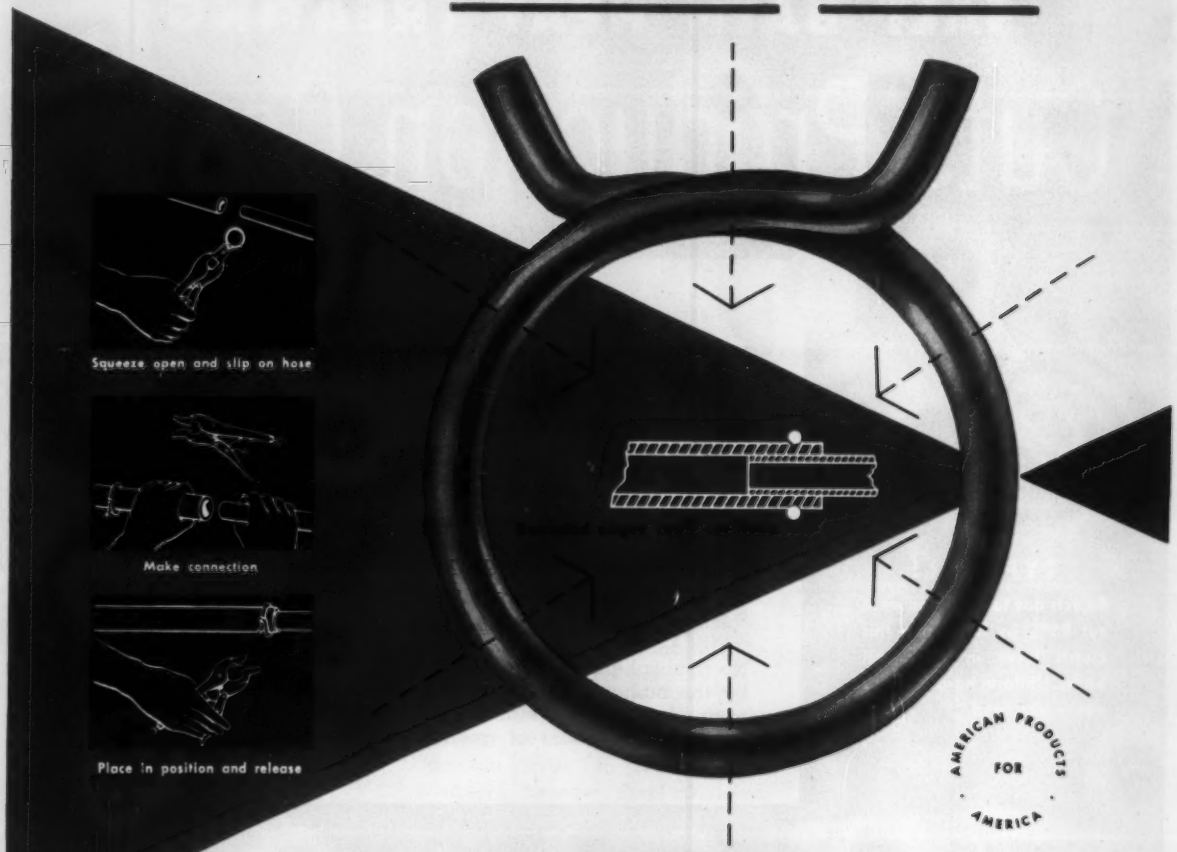

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Boost for Titanium

Demand for the metal is building fast. Here's one capacity expansion. You can bet on more

NATIONAL LEAD CO. and Allegheny Ludlum Steel Corp. will expand titanium sponge production 76 per cent at their jointly owned Titanium Metals Corp. of America plant at Henderson, Nev.

The new capacity will come in toward the end of the year, boosting sponge output from 3600 to 6000 tons a year. Ingot-melting facilities will be expanded to meet the additional production.

Demand Picture — TCMA's expansion will be independent of contractual guarantees from the government. Operations are fully integrated, from ore through selling of rolled, drawn, extruded and forged mill products.

Operations have been at full capacity for some time, enabling the company to make price reductions of 19 per cent for mill products and 23 per cent for sponge in 1955. Output is booked through the third quarter, and demand is expected to rise even more later in the year.

Titanium ingot produced at Henderson is processed into mill products at Allegheny Ludlum's plants. Auxiliary equipment will be added at these plants to handle the new capacity.

Customers — National Lead's New York headquarters says that nonmilitary demand for titanium is rising fast, and that more new commercial applications are to be expected. For defense use, titanium is finding major applications in the J-57 and J-75 jet engines, in the B-52 bomber, in all advanced jet fighters, ballistic missiles and atomic installations.

Civilian jet aircraft, such as the Douglas DC-8 and the Boeing 707, also will use titanium in many structural sections.

Wheeling Shifts Operations

Wheeling Steel Corp., Wheeling, W. Va., will gradually move the operations of its Wheeling factory to other fabricating plants. Some will go to the Steelcrete factory (Beechbottom, W. Va.); some to the Ackermann factory (Wheeling); and some to the Martins Ferry, O., factory. "These changes will take from six months to a year to complete," says W. A. Steele, vice president in charge of operations. Products of the Wheeling factory have included containers, stove pipe and furnace pipe, roofing accessories, floor and roof decking, gasoline tanks for automobiles and trucks and other automotive parts.

GE Forms New Laboratory

A materials and processes laboratory with testing facilities valued at more than $750,000 has been established in Lynn, Mass., by General Electric Co.'s medium steam turbine, generator and gear department. George A. Ross has been named manager of the new facility.

Worthington Broadens Line

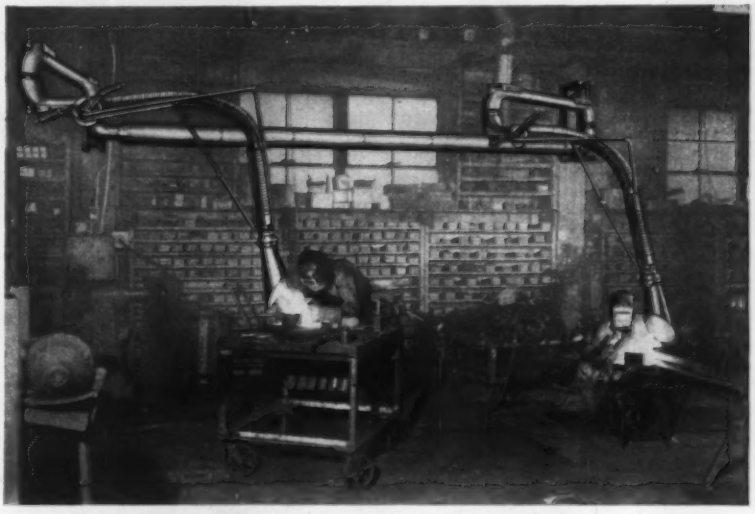
Mason-Neilan Regulator Co., Boston, will merge with Worthington Corp., New York, and will be operated as the Mason-Neilan Division. Worthington makes pumps, compressors, turbines and other types of industrial machinery, while Mason-Neilan makes control valves and regulators.

Carrier Plans Expansion

Carrier Corp., maker of air conditioning, refrigeration and heating equipment, will spend $12 million this year for new buildings and equipment at its headquarters in Syracuse, N. Y. New administration, personnel and research and development buildings will cost about $5 million; production facilities, about $5.5 million; miscellaneous improvements and expansion of facilities, $1.5 million. Expenditures related to research and development will exceed $3 million, or 25 per cent of the total. The project is expected to be completed late this year.

Establishes Alloy Division

West Steel Casting Co., Cleveland, will establish a high nickel alloy division (West Alloy) in facilities recently purchased at 1679



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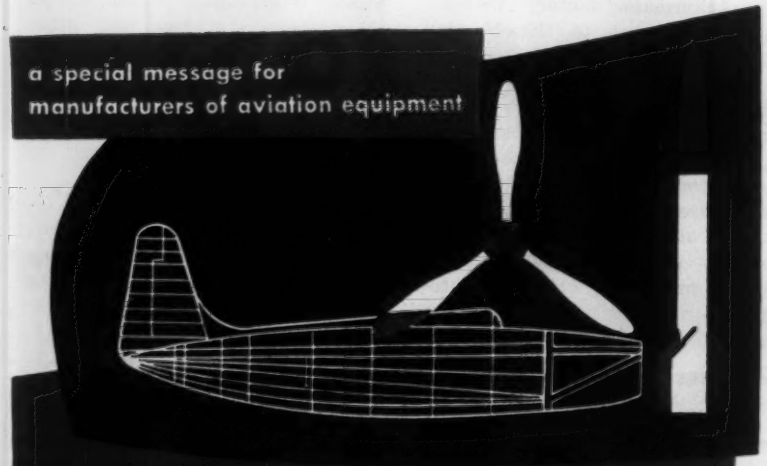

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ON ALUMINUM Iridite gives you a choice of natural aluminum, a golden yellow or dye colored finishes. No special racks. No high temperatures. No long immersion. Process in bulk.

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AND IRIDITE IS EASY TO APPLY. Goes on at room temperature by dip, brush or spray. No electrolysis. No special equipment. No exhausts. No specially trained operators. Single dip for basic coatings. Double dip for dye colors. The protective Iridite coating is not a superimposed film, cannot flake, chip or peel.

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Collamer, East Cleveland, O. A major investment is being made in equipping it. Paul G. Lutz is general manager of the division; L. W. Anderson, works manager. The firm is observing its 50th anniversary this year.

Detroit Firm Buys Sta-Warm

Abrasive & Metal Products Co., Detroit, acquired Sta-Warm Electric Co., Ravenna, O., and will operate it as a subsidiary. Sta-Warm makes electrically heated equipment and various types of pipes and flexible hose.

General Dynamics To Build

General Dynamics Corp., San Diego, Calif., will build a $10-million atomic missile laboratory at Torrey Pines Mesa, Calif. The plant will be used to manufacture the "Atlas" atomic missile, which has a range of more than 1500 miles.

Will Make Truck Bodies

Watkins-Dunn Co. Inc. has been formed in Buffalo (250 Amherst St.) to make motor truck bodies. Officers of the company are: R. J. Dunn, president; T. G. Shamp, vice president; Carl W. Schlez, secretary-treasurer.

Clevite Subsidiary Renamed

Clevite Harris Products Inc. is the new name of Clevite Corp.'s wholly owned subsidiary, Harris Products Co., producer of rubber-and-metal parts and molded rubber products. With headquarters in Cleveland, Clevite Harris operates plants in Napoleon and Milan, O.

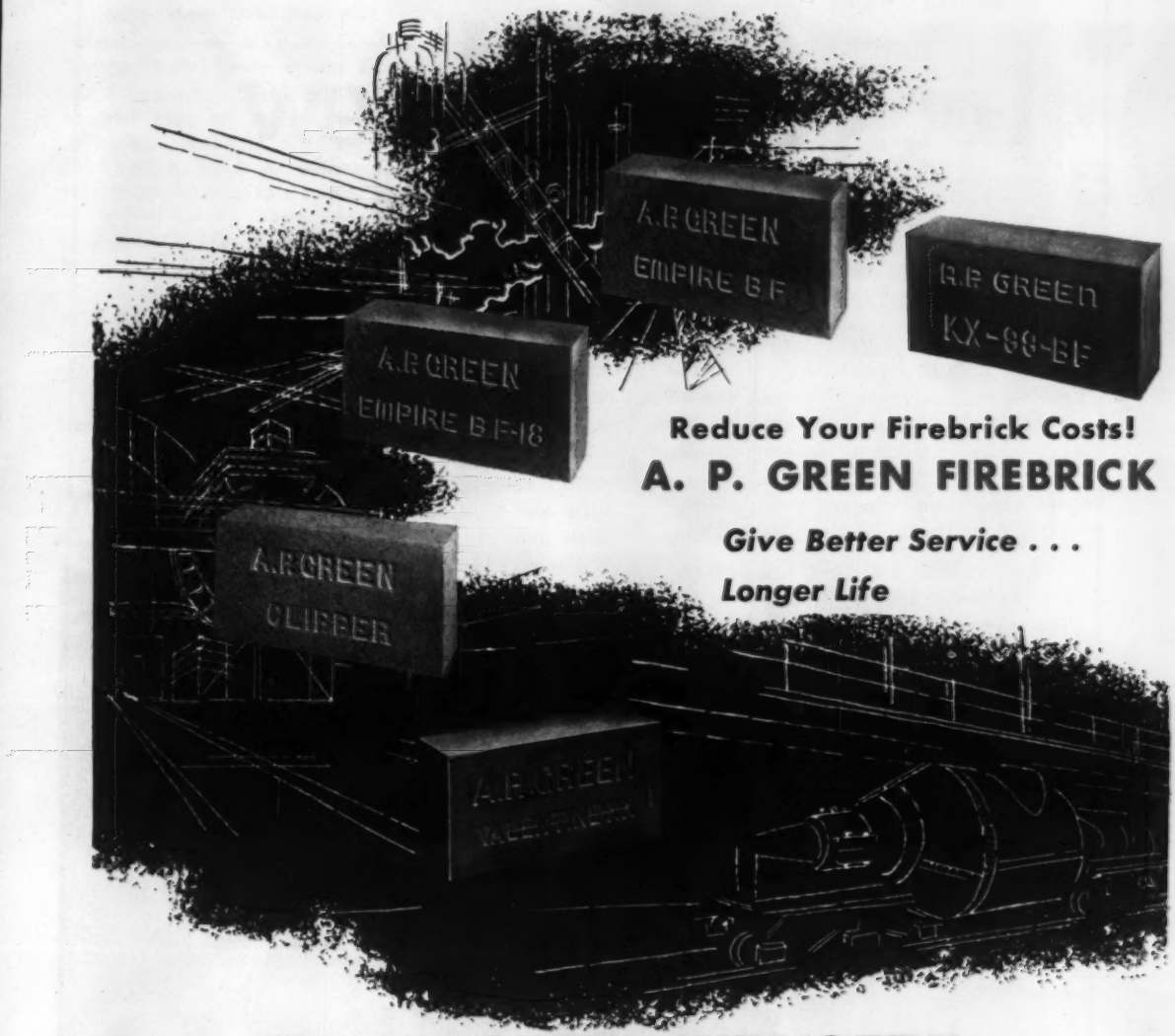
Redmond Builds Motor Plant

Redmond Co., Owosso, Mich., is building a plant in Angola, Ind. Designed to produce a new style fractional horsepower motor, it will be in full operation about May 1.

Plan Atomic Power Plant

A major atomic power plant project is being undertaken jointly by Florida Power & Light Co.,

(*Please Turn to Page* 85)



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On rail wheels the Trackmobile pulls freight cars — moves to and from the track on road wheels. Use it to pull skids and carts when on road wheels.

(*Continued from page 82*)

Miami; Tampa Electric Co., Tampa; and Florida Power Corp., St. Petersburg. These firms have entered into an agreement with Allis-Chalmers Mfg. Co., Milwaukee, and Babcock & Wilcox Co., New York, looking to a target date of 1962-63 for the construction and operation of the plant. Stone & Webster Engineering Corp., Boston, is expected to be associated with the project in connection with the plant's final layout and construction.

Owatonna Tool Building

Owatonna Tool Co. is building a plant on the outskirts of Owatonna, Minn., and expects to place it in operation in early 1957.

Okonite To Re-Equip Plant

Okonite Co., Passaic, N. J., manufacturer of electric wire and cable, acquired the former Studebaker-Packard plant at New Brunswick, N. J., for $4.2 million. Okonite will re-equip the plant and plans to start production about June 1.

Sprague Electric Expanding

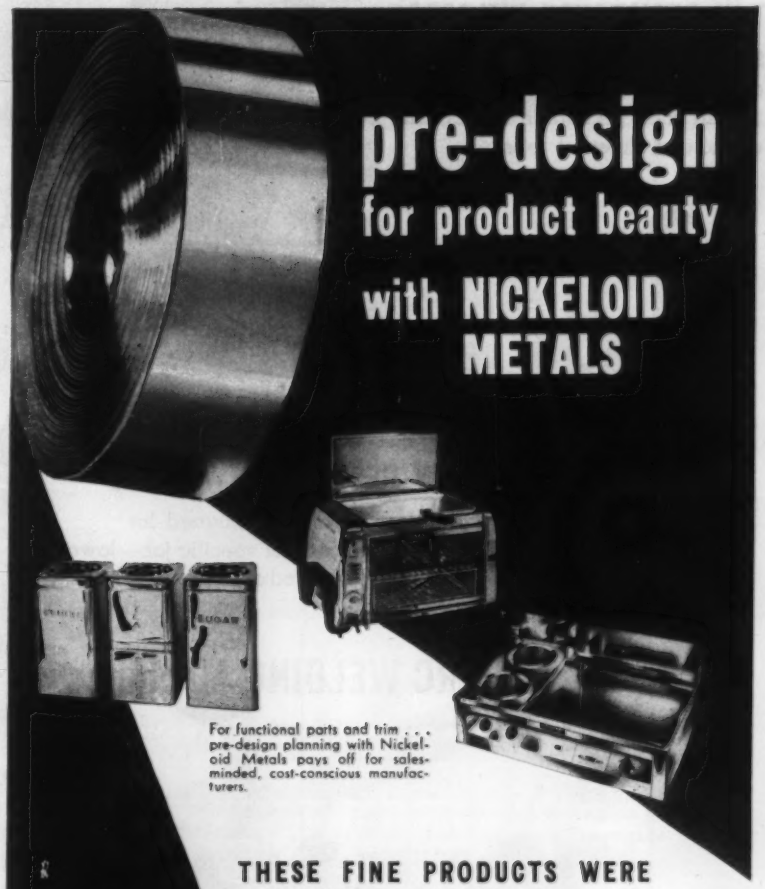
Sprague Electric Co., North Adams, Mass., will build a 20,000-sq-ft plant to manufacture surface-barrier transistors at Concord, N. H. Jesse Ault will be general manager of Sprague's Concord operations.

Establishes Research Center

A shell molding research and development center has been established in Connellsville, Pa., by Shallway Corp. It will be a "clearing house for the exchange of technical information relating to shell molding pattern and corebox design." Shalco Research Center is under the direct supervision of W. J. White, general manager of Shallway.

Steel Firm's Water Needs Up

Growth in steelmaking capacity of Granite City Steel Co., Granite City, Ill., has increased its industrial water needs. It plans to build a pumping station on the Chain of



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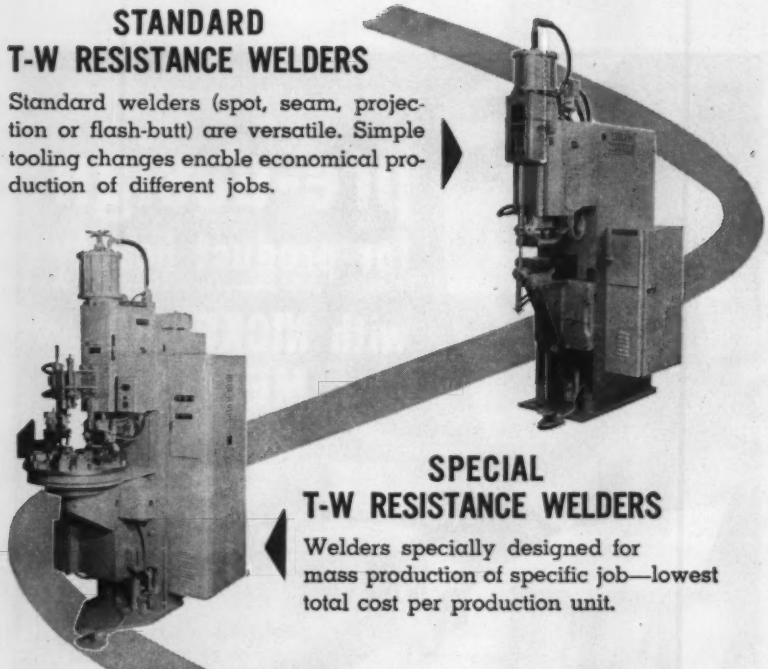

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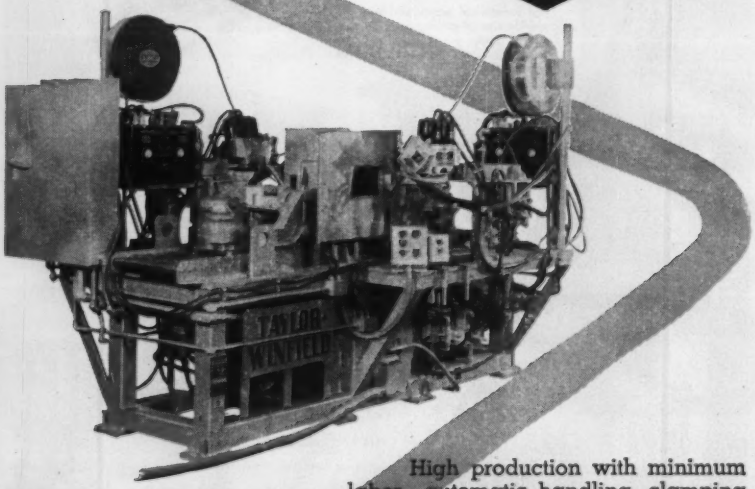

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Rocks Canal of the Mississippi river, a concrete reservoir at its plant and more than 4 miles of underground pipeline. The company will increase its annual ingot capacity (1,080,000 net tons) about 30 per cent by 1958. It consumes 5000 to 6000 gallons of water for every ton of steel it produces and finishes.

Westinghouse To Build Reactor

Westinghouse Electric Corp., Pittsburgh, will build a nuclear materials testing reactor near Waltz Mill, Pa., 9 miles south of Irwin, instead of at Blairsville, Pa., as announced previously. Cost of the test reactor will be $6.5 million.

Cummins Engine To Expand

Cummins Engine Co. Inc., Columbus, Ind., has set aside $6 million for capital additions in 1956. This includes construction of a 73,000-sq-ft addition to its manufacturing plant. Diesel production will be increased 17 per cent immediately—this is in addition to the 21-per-cent increase announced in January.

Precision Steel Expanding

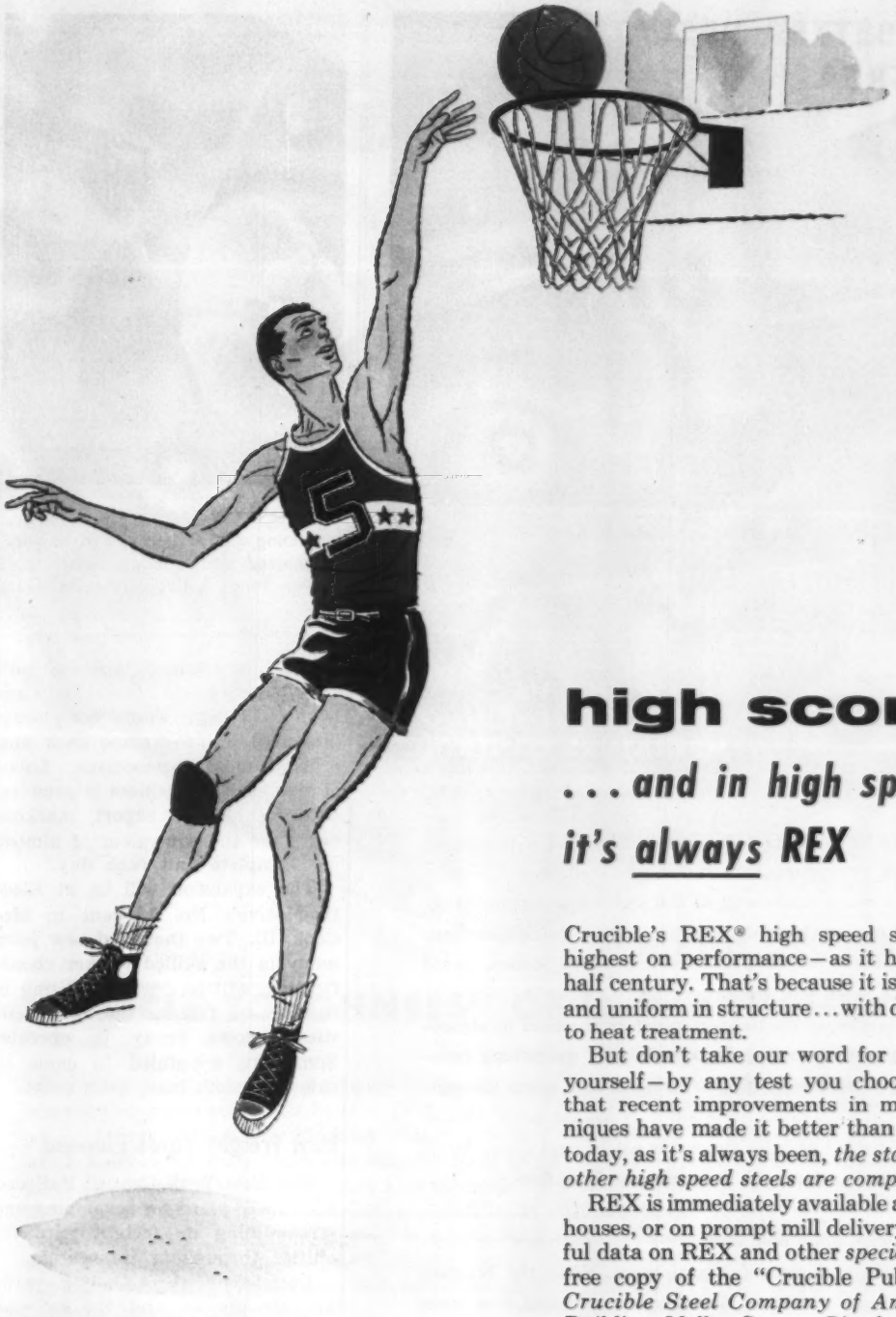
Precision Steel Warehouse Inc., Chicago, plans to build a strip steel processing plant at Franklin Park, Ill. Estimated cost of the 81,000-sq-ft building and facilities is more than $1 million. Operation of the firm's Downers Grove plant will not be affected.

GM Ups Diesel Output

General Motors Corp. will increase manufacturing space at its Electro-Motive Division, LaGrange, Ill., by 42 per cent in the next year.

Reason: Increase in domestic and export diesel railroad engine business and increasing demand for mobile generating units and power plants for deep oil well drilling rigs which the division introduced last year.

Says N. C. Dezendorf, divisional general manager and a vice president of GM: "More than a year ago, Class I railroads stepped up buying to complete dieselization as fast as possible. Then came a big



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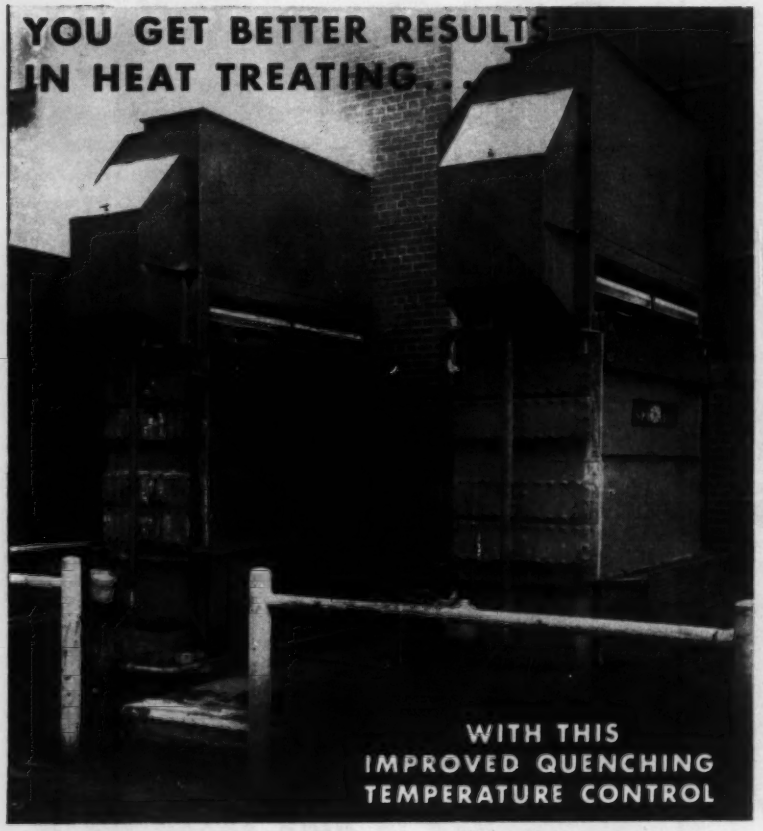

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For further information write for Bulletin No. 120

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Once-Over
Inspecting a 22,000-lb coil of 18-gage galvanized sheet. Equipment is part of new Jones & Laughlin galvanizing line

increase in railroad business, and six major roads that had announced they were completely dieselized in 1954 came back and ordered more locomotives. Locomotive rebuild business is growing each year, and export markets now take the equivalent of almost one complete unit each day."

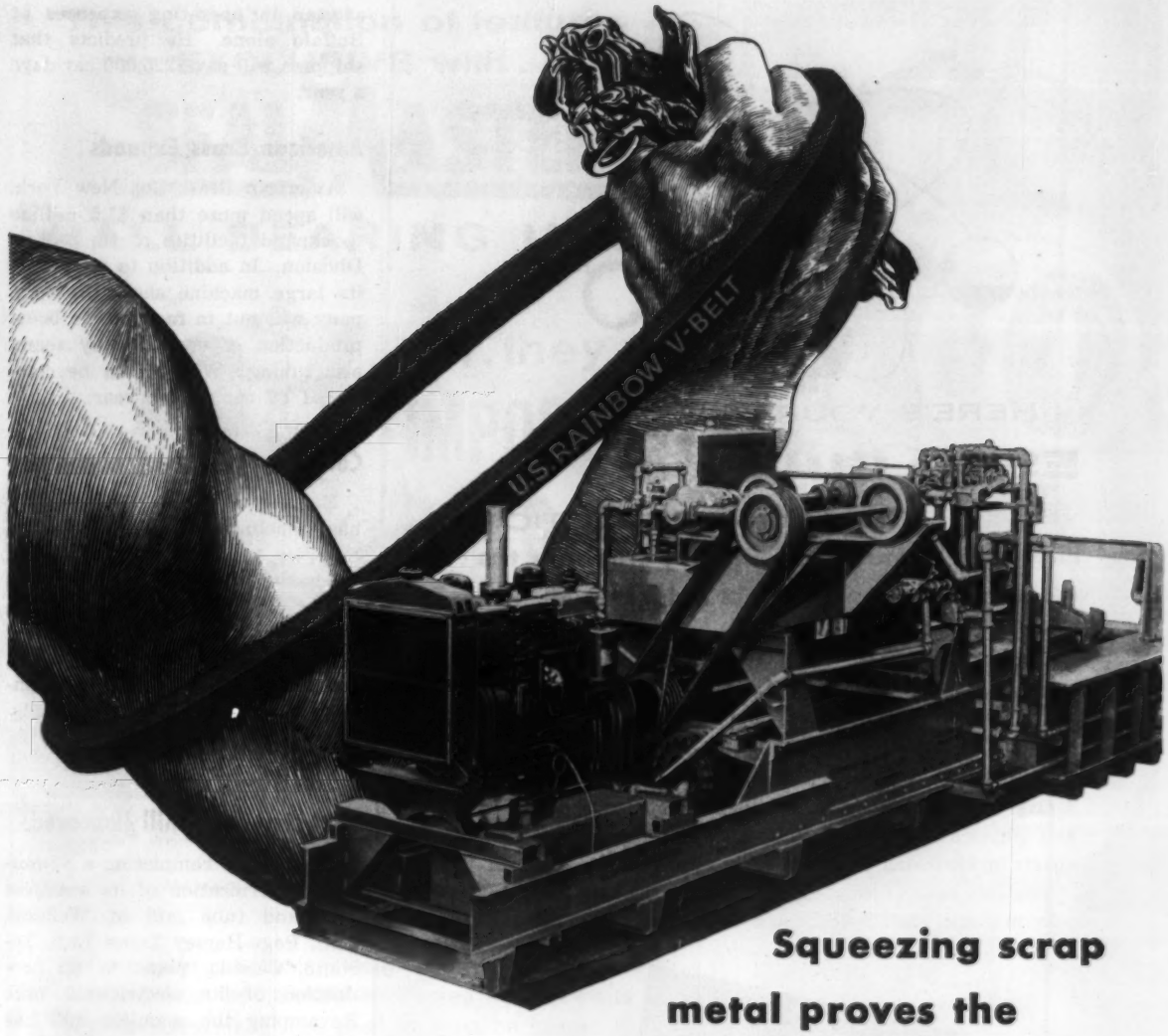
The expansion will be at Electro-Motive's No. 1 plant in McCook, Ill. Two thousand new jobs, many in the skilled worker classification, will be created. Hiring is to start as fast as the new facilities become ready to operate. Some are scheduled to come in this fall.

New Freight Yards Planned

The New York Central Railroad announced plans for revamping and streamlining its freight yard facilities throughout its system.

Details on three major yards are already in, and the railroad says more will be released soon.

Work at Buffalo, Youngstown and Elkhart, Ind., will cost more than $25 million, estimates President Alfred E. Perlman. The Buffalo project will be first. Construction on its $10-million electronically controlled classification yard will get under way in the next few weeks. Mr. Perlman says that the road will save $4.5 million



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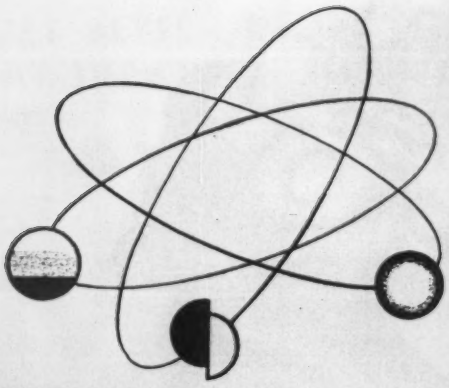

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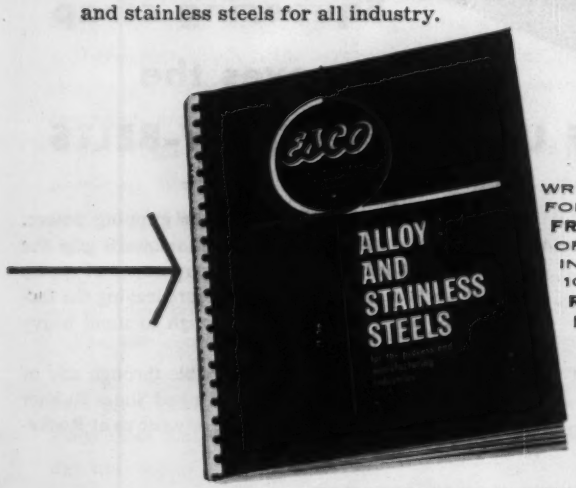

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a year in operating expenses at Buffalo alone. He predicts that shippers will save 225,000 car-days a year.

American Brass Expands

American Brass Co., New York, will spend more than $1.5 million to expand facilities at its Buffalo Division. In addition to relocating its large machine shop, the company will put in facilities to boost production of copper alloy seamless tubing. Work is to be completed by early next year.

Coming: More Ferromanganese

E. J. Lavino & Co., Philadelphia, has announced it will double its facilities at Lynchburg, Va., for producing standard high carbon ferromanganese. The program is under way, and will be completed before the end of the year. It will increase Lavino's annual ferromanganese capacity (120,000 tons) by 50,000 tons and will cost some $4 million.

Canadian Tube Mill Improved

Fresh from completing a $2-million modernization of its seamless pipe and tube mill at Welland, Ont., Page-Hersey Tubes Ltd., Toronto, Canada, plans to up production of its electricweld mill. Revamping the seamless mill has increased its pipe size range from 4 to 7 in. OD.

New Reclaiming Plant

Replacing the zinc dross refining plant in Wheeling, W. Va., which has been operating continuously since 1921, Wheeling Steel Corp. has announced initial operations at its new metal reclaiming unit at Martins Ferry, O.

The plant will be used to recover pure zinc and zinc oxides from Wheeling Steel's galvanizing operations at Martins Ferry and Benwood, W. Va.

Change-Over for Defense

Franklin-Balmar Corp., Woodbury, Md., which is converting its plant for the production of defense aircraft parts, plans to install two more skin milling machines. The

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SHEET METAL FABRICATION

CONDENSATE PUMP TANK

company also will clear its forge shop and replace it with a spar milling department. The switch is to be completed this June.

Holo-Krome Pushes Research

Development of new techniques and methods for metal forging will be the purpose of a Research & Development Division set up by Holo-Krome Screw Corp., West Hartford, Conn. Electronic engineers, physicists and machine designers have been recruited. They will work under Paul W. Klooz, vice president-manufacturing, in a new building on Holo-Krome's West Hartford plant site.

ASSOCIATIONS

Truck-Trailer Manufacturers Association, Washington, has elected its 1956 traffic committee: Chairman is A. L. Rich, vice president Fruehauf Trailer Co., Detroit. Serving with Mr. Rich are Elmer Streibe of Trailmobile Inc., Cincinnati; Jack D. Watson, Hobbs Mfg. Co., Ft. Worth, Tex.; and L. E. Weckert, Dealers Transit Inc., Chicago.

Wayne Dukette, manager of Joseph T. Ryerson Steel Co., Emeryville, Calif., has been elected president of the Northern California Chapter, **American Steel Warehouse Association.**

Laredo Scrap Materials, Laredo, Tex., and Permian Iron & Metal Co., Odessa, Tex., are new members of the **Institute of Scrap Iron & Steel Inc.,** Washington.

Steel Founders' Society of America, Cleveland, has appointed James M. Ritter to its Product Development Committee. Mr. Ritter, assistant sales manager of Farrell-Cheek Steel Co., Sandusky, O., will assist in the development of new markets for steel castings.

Howard C. McMillen, manager of Philco Corp.'s Bedford, Ind., plant, is the new president of the **American Society of Tool Engi-**

(*Please turn to page* 93)

31st ANNUAL
FINANCIAL ANALYSIS
OF THE
STEEL INDUSTRY

Supplement to
STEEL
April 2, 1956

Steel Industry: A Billion-Dollar Earner

THE STEEL INDUSTRY's net profit went over the billion-dollar mark last year for the first time.

Based on the performance of 32 producers representing 93.64 per cent of the nation's ingot capacity, the whole industry's net profit hit $1.1 billion.

This achievement came in one great leap. The most the industry had made before was $766.9 million in 1950. In 1954, net earnings were only $637 million.

The 1955 net profit was 43 per cent better than that of 1950 and 73 per cent above the 1954 figure.

Record Production Helps

Contributing to the earnings record in 1955 was the record-setting production of steel. Almost 5 per cent more steel for ingots and castings was poured last year than in the previous record steelmaking year, 1953. The new steel production record was made possible by record capacity, and output at 93 per cent of this capacity.

Among other reasons for record earnings are increased prices of steel, record volume of sales and sales of a higher-than-usual percentage of the more profitable products, like cold-rolled steel sheets. They comprised 17.9 per cent of mill shipments of steel, compared with a range of 12 to 15.5 per cent in the preceding four years.

Sales volume of the entire industry was $14¼-billion, a rise of 35 per cent over 1954 and 9 per cent over the previous record sales year, 1953.

In 1955, the steel industry was able to keep 7.82 cents out of every sales dollar—the most since 1950's 8 cents. In 1954, it kept 5.99 cents.

The improved earnings picture is reflected in the net income per ton of ingots produced. It jumped to $9.51 from 1954's $7.23 for the 32 companies. Even in the previous high earnings years of 1950 and 1953 the figure was lower.

Absence of a federal excess profits tax (it expired at the end of 1953) also contributed to the improvement in steel industry earnings. Still, federal income taxes took almost as big a slice out of the steel sales dollar (7.78 cents) as was left for the producers.

A Billion Dollars in Taxes

The 32 producers in STEEL's 31st Annual Financial Analysis of the Steel Industry set aside $1,037,250,232 in 1955 for federal income taxes. The tax figure would have been higher but for fast amortization of facilities installed under the government's defense program. Under it, companies are permitted to recover their investments in a short time. While making this recovery, companies pay a reduced amount to the tax collector. As soon as the investments are recovered, tax bills go up.

The federal tax collector got far more than those whose money is invested in the steel industry. Net profit (which was only slightly more than the federal income tax in 1955) has to be split two ways: To the stockholders and for replacement of plant and equipment. Stockholders in the three largest steel companies (they have 54 per cent of the nation's steelmaking capacity) received (in cash dividends) from 40 to 44.5 per cent of the net profit. Their share was only 3.2 to 3.6 per cent of the sales dollar taken in by their companies.

Employment Costs Rise

In contrast, employees in the 32 companies in STEEL's survey received 34 per cent of the sales dollar in 1955. Both the number of employees and the costs of employment went up. There were 6 per cent more employees than in 1954, and employment costs rose 19.8 per cent. Employment costs were up for three reasons: 1. There were more employees. 2. Work weeks were longer because of the heavy volume of steel business. 3. Wage rates rose in mid-1955.

The 32 companies increased their working capital 19 per cent, but current liabilities mounted faster than current assets. So, the ratio of current assets to current liabilities was lowered from 2.68 to 1 in 1954 to 2.60 to 1 in 1955.

Long-term debt of the 32 producers rose only 2 per cent in 1955.

THIS SPECIAL REPORT is compiled from data from 32 producers representing 93.64 per cent of the steelmaking capacity in the United States

	Rated Ingot Capacity, Net Tons		Ingot Production, Net Tons		Steel Operating Rate, Per Cent		Net Income Per Ton Ingots Produced	
	1955	1954	1955	1954	1955	1954	1955	1954
United States Steel Corp.	39,215,000	38,877,000	35,309,000	28,355,000	90.80[11]	73.20[11]	$10.48	$6.89
Bethlehem Steel Corp.	19,100,000	18,500,000	18,820,912	13,810,076	98.54	74.65	9.57	9.62
Republic Steel Corp.	10,262,000	10,262,000	9,680,121	6,972,812	97.10[11]	69.80	8.91	7.58
Jones & Laughlin Steel Corp.	6,166,500	6,166,500	6,190,000	4,570,000	100.38	74.11	8.09	5.48
National Steel Corp.	6,000,000	6,000,000	NA	NA	NA	NA	NA	NA
Youngstown Sheet & Tube Co.	5,750,000	5,520,000	5,571,556	3,868,525	100.93[9]	70.08	7.48	5.22
Armco Steel Corp.	5,150,000	4,950,000	5,099,905	4,448,772	99.03	89.87	12.62	9.24
Inland Steel Co.	5,000,000	4,700,000	5,189,509	4,522,257	103.79	96.22	10.11	9.13
Colorado Fuel & Iron Corp.[4]	2,471,500	2,469,035	1,936,402	1,845,693	78.35	74.75	5.62	3.82
Wheeling Steel Corp.	2,130,000	2,130,000	2,057,283	1,589,643	96.59	74.63	8.41	6.04
Sharon Steel Corp.	1,550,000	1,550,000	1,528,686	846,515	98.62	54.61	5.23	3.70
Kaiser Steel Corp.[4]	1,536,000	1,536,000	1,432,742	1,382,877	93.28	90.03	4.01	5.73
McLouth Steel Corp.	1,380,000	1,200,000	NA	NA	NA	NA	NA	NA
Crucible Steel Co. of America	1,351,400	1,351,400	1,222,176	808,729	90.44	59.84	10.81	4.58
Pittsburgh Steel Co.	1,320,000	1,320,000	1,303,503	1,070,386	98.75	76.24[11]	5.77	2.03
Detroit Steel Corp.	1,290,000	660,000	888,443	442,753	68.87	67.08	7.11	1.95
Granite City Steel Co.	1,080,000	1,080,000	1,091,389	634,909	101.05	58.78	11.55	6.32
Barium Steel Corp.	893,000	893,000	520,900	237,000	58.23	26.54	[12]	[12]
Allegheny Ludlum Steel Corp.	864,200	864,200	683,195	431,068	79.06	49.88	21.93	9.85
Northwestern Steel & Wire Co.[5]	825,000	825,000	502,443	308,780	60.90	37.43	8.22	3.30
Lukens Steel Co.[6]	750,000	675,000	840,690	631,834	94.00	93.60	3.18	3.19
Newport Steel Corp.[7]	708,537	708,537	424,273	154,658	59.88	21.82	2.16	.40‡
Alan Wood Steel Co.	625,000	625,000	665,908	345,918	106.55	55.35	3.83	3.60
Copperweld Steel Co.[8]	618,380	618,380	[13]	[13]	[13]	[13]	[13]	[13]
Lone Star Steel Co.	550,000	550,000	556,304	379,009	101.15	68.91	8.55	2.66‡
Laclede Steel Co.	500,000	500,000	473,708	396,023	94.74	79.20	8.54	7.43
Keystone Steel & Wire Co.	425,000	425,000	416,090	334,444	97.90	78.69	21.07	18.28
Continental Steel Corp.	394,000	394,000	384,380	336,149	97.56	85.32	7.86	5.93
Atlantic Steel Co.	325,068	300,000	251,704	169,353	77.43	56.45	4.36	4.56
Rotary Electric Steel Co.	300,000	300,000	270,283	172,916	90.09	57.64	13.96	10.70
Carpenter Steel Co.[4]	76,731	76,731	65,315	55,413	85.12	72.22	53.51	45.91
Vanadium-Alloys Steel Co.[4]	42,000	42,000	11,783	13,356	28.05	31.80	124.16	104.87
Total (or average)	118,649,316	116,068,783	103,388,608	79,134,868	93.44	73.10	$9.51	$7.23

	Number of Shares of Common Stock Outstanding		Common Stock Valuation		Preferred Stock Valuation	
	1955	1954	1955	1954	1955	1954
United States Steel Corp.	53,495,274	52,782,044	$891,587,900	$879,700,733	$360,281,100	$360,281,100
Bethlehem Steel Corp.	9,597,127	9,582,942	305,445,730	303,459,830	93,388,700	93,388,700
Republic Steel Corp.	15,437,177	7,325,956	154,585,856	171,252,702	None	None
Jones & Laughlin Steel Corp.	6,293,770	6,196,554	62,769,000	61,906,000	29,357,000	29,357,000
National Steel Corp.	7,379,685	7,362,045	73,796,850	73,620,450	None	None
Youngstown Sheet & Tube Co.	3,378,506	3,353,546	106,314,056	105,243,374	None	None
Armco Steel Corp.	10,634,112	5,229,574	106,341,123	52,295,736	None	None
Inland Steel Co.	5,509,767	5,215,967	93,633,807	78,016,383	None	None
Colorado Fuel & Iron Corp.[4]	2,705,671	2,603,462	13,442,248	13,017,911	11,355,664	11,929,278
Wheeling Steel Corp.	1,909,780	1,425,173	19,097,800	37,054,498	35,752,600	35,752,600
Sharon Steel Corp.	1,100,000	1,100,000	11,060,390	11,060,390	None	None
Kaiser Steel Corp.[4]	3,200,000	3,200,000	3,200,000	3,200,000	39,121,625	39,540,375
McLouth Steel Corp.	1,189,600	1,189,600	2,974,000	2,974,000	24,421,150	27,000,000
Crucible Steel Co. of America	1,641,162	821,784	41,029,000	20,544,607	None	27,605,500
Pittsburgh Steel Co.	1,441,102	1,386,644	14,411,020	14,525,692	24,194,300	24,194,300
Detroit Steel Corp.	3,018,932	2,419,017	3,018,932	2,419,017	6,000,000	None
Granite City Steel Co.	2,017,074	1,640,409	25,233,365	20,566,605	4,470,000	12,125,600
Barium Steel Corp.	3,227,700	3,082,737	3,227,700	3,082,737	None	None
Allegheny Ludlum Steel Corp.	1,777,706	1,689,360	1,777,706	1,689,360	4,057,200	8,134,500
Northwestern Steel & Wire Co.[5]	817,825	817,825	4,089,125	4,089,125	None	None
Lukens Steel Co.[6]	317,976	317,976	3,179,760	3,179,760	None	None
Newport Steel Corp.[7]	1,060,988	1,065,491	1,060,988	1,065,491	None	None
Alan Wood Steel Co.	675,735	656,053	6,757,350	6,560,530	6,017,300	6,312,900
Copperweld Steel Co.[8]	755,218	515,188	3,776,090	2,575,940	4,145,000	4,227,750
Lone Star Steel Co.	2,640,000	2,640,000	2,640,000	2,640,000	None	None
Laclede Steel Co.	206,250	206,250	4,125,000	4,125,000	None	None
Keystone Steel & Wire Co.	1,875,000	1,875,000	2,604,167	2,604,167	None	None
Continental Steel Corp.	501,620	501,620	7,018,789	7,018,789	None	None
Atlantic Steel Co.	389,380	94,690	2,000,000	1,000,000	700,000	700,000
Rotary Electric Steel Co.	696,700	348,350	6,967,000	3,483,500	None	None
Carpenter Steel Co.[4]	427,248	427,248	2,136,240	2,136,240	None	None
Vanadium-Alloys Steel Co.[4]	430,651	422,299	2,000,000	2,000,000	None	None
Total (or average)	145,748,736	127,494,804	$1,981,300,992	$1,898,108,567	$643,261,639	$680,549,603

Boldface type is used under those columns in which figures from all 32 companies were not received. NA=Not Available.
*Denotes a credit. ‡Denotes a deficit.

[1] Excluding amount maturing within one year.
[2] After federal income taxes but before interest on funded de
[3] Including funded debt due within one year.
[4] Fiscal years ended June 30.
[5] Fiscal years ended July 31.

FINANCIAL ANALYSIS OF THE STE

Net Income Per Ton Ingot Capacity 1955	Net Income Per Ton Ingot Capacity 1954	Capitalization Per Ton Ingot Capacity 1955	Capitalization Per Ton Ingot Capacity 1954	Average Number Employed 1955	Average Number Employed 1954	Total Employment Costs 1955	Total Employment Costs 1954	Funded Debt[1] 1955	Funded Debt[1] 1954	Surplus 1955	Surplus 1954	Total Capitaliza 1955	Total Capitaliza
$9.44	$5.03	$73.15	$68.75	272,646	268,142	$1,614,885,659	$1,386,952,824	$286,083,534	$324,120,277	$1,330,703,051	$1,108,730,808	$2,868,655,585	$2,6
9.43	7.18	79.74	66.60	147,054	138,143	779,815,730	657,689,497	336,904,500	152,174,000	787,236,115	683,072,085	1,522,975,045	1,23
8.41	5.15	63.35	61.33	66,083	57,753	395,602,510	300,579,588	44,029,724	91,468,450	451,511,236	366,597,099	650,126,815	62
8.13	4.06	85.33	80.67	41,001	38,511	236,708,000	186,989,000	105,473,000	113,972,000	328,613,000	292,204,000	526,212,000	49
8.05	5.06	75.49	71.18	28,889	26,486	173,878,283	147,628,987	55,000,000	55,000,000	324,115,137	298,461,656	452,911,987	42
7.25	3.66	80.50	78.40	28,262	25,681	168,539,739	126,935,102	100,000,000	100,000,000	256,576,715	227,520,958	462,890,771	43
12.50	8.30	86.22	81.57	31,216	29,057	191,113,133	167,859,923	57,329,355	64,094,018	280,345,277	287,359,698	444,015,755	40
10.49	8.78	83.28	81.76	27,908	26,749	155,977,609	138,034,107	84,115,800	97,001,800	238,665,494	209,243,572	416,415,101	38
4.41	2.86	68.92	66.31	20,652	21,102	107,240,055	101,064,439	55,312,000	56,300,000	90,215,453	82,485,486	170,325,365	16
8.12	4.51	107.89	96.65	14,075	13,099	91,723,355	76,069,331	48,944,800	49,191,100	126,001,467	83,868,214	229,796,667	20
5.15	2.02	47.16	44.33	9,061	8,146	51,254,718	36,308,035	5,000,000	5,850,000	57,038,561	51,800,939	73,098,951	6
3.74	5.16	159.72	160.15	8,151	7,891	40,635,694	37,004,632	130,943,547	138,185,525	63,364,270	61,158,949	245,329,442[10]	24
5.90	1.41	92.55	110.43	3,098	2,293	NA	NA	65,551,000	74,500,000	34,770,378	28,039,536	127,716,528	13
9.77	2.74	95.34	88.79	15,359	14,115	87,803,408	65,423,237	30,820,447	31,389,000	56,998,410	40,455,916	128,847,857	11
5.69	1.64	89.69	88.17	10,108	9,335	61,942,833	51,002,931	32,337,763	36,393,239	47,454,143	41,272,681	118,397,226	11
4.90	1.31	66.43	114.03	4,744	4,217	17,049,752	16,339,862	28,000,000	35,060,000	48,674,277	37,782,468	85,693,209	7
11.68	3.71	94.85	83.55	4,732	4,361	26,078,590	19,178,962	34,250,000	29,623,266	38,482,977	27,917,502	102,436,342	9
[12]	[12]	[12]	[12]	5,700	4,300	23,252,795	22,156,967	1,792,634	1,347,295	19,594,852	19,139,945	24,615,186	2
17.34	4.91	140.16	130.27	13,925	12,156	87,477,993	66,105,990	30,276,000	32,507,000	85,015,015	70,249,590	121,125,921	11
5.01	1.23	35.86	26.71	2,677	2,318	14,913,355	11,935,066	8,734,777	4,906,206	16,761,565	13,038,509	29,585,467	2
2.99	2.98	46.40	49.76	4,768	4,948	31,653,750	25,429,323	5,600,000	6,430,000	26,016,891	23,980,073	34,796,651	3
1.29	.09‡	30.05	29.83	2,230	1,456	10,483,539	6,400,618	114,956	222,956	20,424,847	19,841,878	21,600,791	2
4.08	1.99	57.52	58.60	3,388	2,974	19,582,767	14,004,721	5,250,000	7,000,000	17,922,651	16,754,640	35,947,301	3
[13]	[13]	[13]	[13]	3,972	3,361	24,056,982	17,408,193	5,332,000	5,422,000	22,321,806	16,904,424	35,574,896	2
8.65	1.83‡	186.98	190.97	4,259	4,130	20,316,746	17,401,150	75,916,082	82,873,245	24,282,207	19,523,120	102,838,289	10
8.09	5.89	49.32	44.21	3,470	3,086	18,551,024	15,662,572	2,999,915	3,257,366	17,533,785	14,724,232	24,658,700	2
20.63	14.39	73.64	61.83	2,582	2,251	16,703,862	13,199,396	None	None	28,692,623	23,674,104	31,296,790	2
7.67	5.06	58.18	54.83	2,710	2,654	14,020,371	12,661,618	2,400,000	2,600,000	13,502,295	11,984,235	22,921,084	2
3.38	2.58	36.94	23.26	1,909	1,744	10,557,306	8,346,745	None	None	9,307,507	5,278,800	12,007,508	
12.57	6.17	76.60	62.60	1,241	1,045	9,349,655	5,929,235	5,021,000	3,198,000	10,993,385	12,098,211	22,981,385	1
45.55	33.15	362.90	335.45	3,116	2,836	17,513,968	17,425,891	None	None	25,709,599	23,603,089	27,845,839	2
34.83	33.35	239.66	223.41	1,078	1,141	4,562,625	5,234,910	None	None	8,065,692	7,383,225	10,065,692	
$8.78	$5.21	$77.40	$72.48	790,064	745,481	$1,523,215,806	$3,774,362,852	$1,643,532,834	$1,604,086,743	$4,906,910,681	$4,226,149,642	$9,183,706,146	$8,41

Book Value Per Share of Common Stock 1955	Book Value Per Share of Common Stock 1954	Number of Common Stockholders 1955	Number of Common Stockholders 1954	Number of Preferred Stockholders 1955	Number of Preferred Stockholders 1954	Preferred Dividend Requirements 1955	Preferred Dividend Requirements 1954	Net Earnings Per Common Share 1955	Net Earnings Per Common Share 1954	Dividends Per Share on Preferred 1955	Dividends Per Share on Preferred 1954	Dividends Per Share on Common 1955	Dividends Per Share on Common 1954	Federal Income Taxes 1955	Federal Income Taxes 19
$41.54	$37.67	244,347	221,896	66,628	68,720	$25,219,677	$25,219,677	$6.45	$3.22	$7.00	$7.00	$2.30	$1.63	$366,000,000	$190,0
113.86	102.95	84,268	82,762	20,196	20,903	6,537,209	6,537,209	18.09	13.18	7.00	7.00	7.25	5.75	181,000,000	119,0
39.26	36.71[14]	83,063	69,464	None	None	None	846,129	5.59	3.55[14]	None	3.00	2.50	2.25[14]	84,000,000	49,9
62.19	57.15	41,526	38,828	5,934	6,216	1,468,000	1,468,000	7.73	3.80	5.00	5.00	2.25	2.00	46,500,000[15]	22,5
53.93	50.64	NA	NA	None	None	None	None	6.54	4.12	None	None	3.25	3.00	48,275,000	27,7
107.41	99.23	15,998	16,241	None	None	None	None	12.34	6.02	None	None	3.75	3.75	41,867,500[16]	12,1
36.36	32.48[14]	50,275	47,615	None	None	None	None	6.05	3.93[14]	None	None	1.95	1.50[14]	66,613,787	42,5
60.31	55.07	23,229	20,421	None	None	None	None	9.52	7.92	None	None	4.25	3.75	53,050,000	37,9
38.33	36.70	14,650	14,542	2,323	2,059	634,034	647,766	3.79	2.46	5.25[19]	5.25[19]	1.10[18]	.75[18]	10,681,800[22]	6,1
75.98	77.13[17]	9,959	8,405	4,688	4,809	1,787,630	1,787,630	8.12	4.98[17]	5.00	5.00	3.00[18]	3.00	18,480,000	8,4
61.91	57.15	7,578	8,182	None	None	None	None	7.26	2.85	None	None	2.50	2.50	7,840,000	1,8
20.81	20.12	7,181	11,000	14,279	15,500	2,292,970	2,318,956	1.08	1.75	1.46	1.46	.40	.50	None	3,3
31.73	26.07	3,246	2,151	2	2	1,417,500	708,750	5.66	.83	2.63	1.31	None	None	7,375,000	2,0
59.73	74.23	7,263	3,284	None	4,783	None	1,380,275	8.05	2.83	2.50	5.00	2.50	[18]	15,570,000	4,3
42.93	40.24	4,082	2,842	2,999	3,247	1,308,150	1,308,150	4.31	.62	10.50[19]	10.50[19]	.25[18]	[18]	7,321,000[20]	1,4
17.12	16.16	4,253	3,403	1	None	55,000	None	2.07	.29	.92	None	.25	None	6,715,966	
31.56	29.47	9,825	8,007	768	2,038	440,105	667,475	6.05	2.04	5.50	5.50	2.00	1.19[18]	13,703,700[21]	4,4
7.07	7.21	8,750	8,525	None	None	None	None	.20	.14‡	None	None	[18]	.24[18]	995,255	1,7
48.82	42.58	14,950	14,136	1,262	2,287	325,906	355,890	8.25	2.30	4.38	4.38	2.35	2.00	16,554,000	4,4
25.50	20.94	1,023	1,010	None	None	None	None	5.05	1.25	None	None	.50	None	4,610,000	1,0
91.82	85.41	1,336	1,402	None	None	None	None	7.05	6.33	None	None	2.00	3.50	3,302,500	2,0
20.79	19.88	345	1,025	None	None	None	None	.86	.06‡	None	None	None	.20	979,638	2
36.52	35.54	1,417	1,250	686	687	306,433	315,645	3.32	1.42	5.00	5.00	1.40[18]	.35[18]	1,619,000	2
34.56	37.81	5,633	3,870	1,054	1,075	244,553	248,093	2.81	.88	5.50[19]	5.50[19]	1.70	1.80	2,990,000	6
10.20	8.40	9,530	9,000	None	None	None	None	1.80	.38‡	None	None	None	None	4,665,000	N
105.01	91.39	1,563	1,391	None	None	None	None	19.62	14.27	None	None	6.00	6.40	4,700,000	3,0
16.69	14.02	4,092	4,062	None	None	None	None	4.68	3.26	None	None	2.00	1.60	8,830,268	6,9
40.91	37.88	2,883	2,880	None	None	None	None	6.02	3.97	None	None	3.00	2.00	2,760,000	1,6
29.04	66.31	2,536	694	267	270	45,997	45,997	2.70	7.67	7.00	7.00	1.09	2.40	1,205,818	8
25.78	44.73	1,671	1,243	None	None	None	None	5.41	5.31	None	None	2.00	3.00	4,150,000	1,9
65.17	60.24	3,052	3,252	None	None	None	None	8.18	5.95	None	None	3.25	3.00	2,630,000	3,9
23.37	22.22	1,905	1,730	None	None	None	None	3.40	3.32	None	None	1.80[18]	2.10[18]	1,165,000	1,8
....	....	671,429	614,513	121,087	132,596	$42,083,164	$43,855,642	$6.86	$4.40	....	....	....	....	$1,037,250,232	$556,2

[6] 1955 figures represent 62 weeks ended Dec. 31, except for steel operating rate, net income per ton ingot capacity, total income —per cent of capitalization, and net income per common share, which are figured on a 52-week basis. 1954 figures represent 52 weeks ended Oct. 23.

[7] Fiscal years ended Oct. 31.
[8] 1954 figures are adjusted to conform with 1955 Registration Statement.
[9] Steel operating rate based on capacity of 5,520,000 net tons.
[10] Includes provisions for future income taxes of $8,700,000 in 1955 and $3,900,000 in 1954.

[11] Steel operating rate adjusted.
[12] Not applicable to company's operations.
[13] Comparisons would be misleading as com clude fabricating plants with no steel ing

EEL INDUSTRY FOR 1955

Compiled by STEEL

April 2, 1956

pitalization 1954	Provision For Depreciation, Depletion 1955	1954	Total Income—Per Cent of Capitalization[2] 1955	1954	Interest On Funded Debt 1955	1954	Net Sales 1955	1954	Net Profit—Per Cent of Net Sales 1955	1954	Net Income 1955	1954	
$2,672,832,918	$285,199,386	$261,839,325	13.22	7.51	$9,071,803	$5,191,459	$4,097,680,287	$3,250,369,279	9.03	6.01	$370,099,353	$195,417,611	
1,232,094,615	102,653,998	92,882,804	12.38	11.32	8,368,132	6,683,204	2,114,599,636	1,667,377,179	8.52	7.97	180,191,708	132,837,154	
629,318,251	45,472,391	41,613,065	13.57	9.11	1,939,455	4,465,440	1,188,559,765	846,310,670	7.26	6.25	86,271,491	52,875,164	
497,439,000	37,021,000	33,794,000	10.19	5.78	3,541,000	3,731,000	696,538,000	492,941,000	7.19	5.08	50,104,000	25,032,000	Jo
427,082,106	40,235,237	37,683,629	11.05	7.51	1,759,202	1,759,202	622,018,919	484,058,380	7.76	6.27	48,289,453	30,334,871	
432,764,332	41,217,490	36,849,501	9.71	5.40	3,225,000	3,187,500	626,232,840	433,406,272	6.66	4.66	41,701,140	20,182,500	You
403,749,452	33,880,730	32,221,463	14.95	10.78	2,045,660	2,412,970	692,683,234	532,045,314	9.29	7.72	64,350,609	41,100,266	
384,261,755	21,529,968	18,976,213	13.25	11.60	2,701,727	3,276,216	663,317,374	537,024,479	7.91	7.69	52,466,098	41,287,152	
163,732,675	8,025,886	9,922,840	8.01	6.04	2,761,888	2,843,425	257,543,050	250,235,696	4.23	2.82	10,887,163	7,051,729	Co
205,866,412	15,805,982	13,152,335	8.16	5.53	1,460,221	1,780,800	249,445,016	190,224,955	6.93	5.04	17,295,711	9,595,740	
68,711,329	4,714,399	3,973,917	11.21	4.90	204,608	230,133	173,095,949	99,347,910	4.61	3.16	7,987,622	3,134,864	
245,984,849[10]	14,391,312	13,059,200	4.66	5.52	5,687,532	5,654,848	136,311,098	128,883,898	4.21	6.15	5,741,236	7,926,666	
132,513,536	5,623,189	1,949,080	8.95	3.71	3,280,401	3,219,441	144,987,476	59,133,532	5.62	2.87	8,148,342	1,694,890	
119,995,023	10,733,440	9,972,743	11.30	4.35	1,352,203	1,517,862	237,715,380	160,621,738	5.56	2.31	13,208,602	3,705,952	Cru
116,385,912	5,738,065	5,200,724	7.64	3.22	1,534,345	1,578,007	177,707,556	124,438,118	4.23	1.74	7,515,470	2,170,694	
75,261,485	3,854,797	3,381,646	9.56	3.79	1,929,010	2,011,024	101,803,010	51,707,907	6.21	1.67	6,317,860	862,528	
90,232,973	5,185,040	3,046,123	13.90	6.44	1,625,920	1,796,600	116,293,657	69,265,197	10.84	5.79	12,610,820	4,012,192	
23,569,977	1,831,350	1,901,696	3.15	1.40‡	120,545	110,368	75,084,700	53,484,604	.87	.82‡	655,319	441,212‡	
112,580,450	10,861,722	9,812,413	13.23	4.66	1,042,988	1,002,997	255,587,054	170,056,405	5.86	2.50	14,985,660	4,246,083	All
22,033,840	1,240,826	1,183,068	15.69	8.52	490,787	857,951	51,403,405	35,628,171	8.04	2.86	4,131,969	1,018,754	North
33,589,833	1,993,666	2,402,267	7.28	6.88	349,353	294,806	97,641,729	74,954,710	2.74	2.69	2,672,770	2,014,791	
21,130,325	687,727	579,133	4.29	.22‡	11,066	15,468	36,913,883	18,178,502	2.48	.34‡	915,233	62,012‡	
36,628,070	4,378,694	2,561,794	7.77	4.00	242,222	466,905	58,375,609	36,085,476	4.37	3.45	2,551,530	1,246,251	
29,130,114	1,602,285	1,460,199	7.50	3.31	308,065	264,980	78,490,150	49,711,246	3.01	1.41	2,365,459	703,150	
105,036,365	12,382,258	8,589,489	8.65	3.03	4,138,778	4,194,620	74,489,168	37,208,043	6.39	2.71‡	4,759,086	1,008,778‡	
22,106,598	1,622,241	1,501,356	16.88	13.88	118,283	126,573	58,191,338	45,364,073	6.95	6.49	4,047,053	2,943,150	
26,278,271	1,166,397	1,058,387	28.02	23.27	None	None	62,020,363	49,332,276	14.14	12.40	8,768,519	6,114,772	
21,603,024	1,337,564	1,238,698	13.64	9.74	103,250	110,750	44,881,747	35,661,856	6.73	5.59	3,022,143	1,993,337	
6,978,800	717,117	653,559	11.79	11.07	None	None	28,729,529	20,466,960	3.82	3.77	1,097,343	772,527	
18,779,711	1,264,391	1,176,487	17.38	10.79	221,190	175,725	54,370,322	31,643,658	6.94	5.84	3,772,074	1,849,810	
25,739,329	1,803,411	1,329,622	12.55	9.88	None	None	43,999,585	44,898,964	7.94	5.66	3,495,065	2,543,795	
9,383,225	275,789	260,910	14.53	14.93	None	None	14,250,562	14,479,935	10.27	9.67	1,462,933	1,400,628	
$8,412,794,555	$724,447,748	$655,227,686	11.99	7.89	$59,634,634	$58,960,274	$13,330,961,391	$10,094,546,403	7.82	5.99	$1,041,888,834	$604,557,019	

es 1954	Total Assets 1955	1954	Current Assets 1955	1954	Current Liabilities[3] 1955	1954	Ratio of Current Assets to Current Liabilities 1955	1954	Working Capital 1955	1954	
190,000,000	$3,620,360,616	$3,348,696,299	$1,343,139,271	$1,326,041,826	$647,997,947	$574,028,605	2.07—1	2.31—1	$695,141,324	$752,013,221	
119,000,000	1,998,652,454	1,613,443,531	1,202,487,089	803,127,881	392,492,614	302,964,483	3.06—1	2.65—1	809,994,475	500,163,398	
49,900,000	764,474,465	747,970,933	353,421,840	325,279,420	97,291,424	98,882,253	3.63—1	3.29—1	256,130,416	226,397,167	
22,543,000	1,007,736,000	902,516,000	268,266,000	191,575,000	102,936,000	67,598,000	2.61—1	2.83—1	165,330,000	123,977,000	Jo
27,750,000	591,331,493	547,924,932	227,671,610	209,884,720	104,151,048	88,115,282	2.19—1	2.38—1	123,520,562	121,769,438	
12,104,000	573,454,851	500,542,724	315,762,970	240,166,192	97,658,481	57,081,680	3.23—1	4.21—1	218,104,489	183,084,512	Yo
42,522,317	563,097,135	490,196,908	289,244,766	224,687,330	106,442,417	76,904,049	2.72—1	2.92—1	182,802,349	147,783,281	
37,930,000	513,758,850	460,686,798	256,090,367	227,057,856	90,195,217	68,906,364	2.84—1	3.30—1	165,895,150	158,151,492	
6,125,000	223,241,515	203,359,590	108,277,397	92,424,547	41,573,797	31,821,277	2.60—1	2.90—1	66,703,600	60,603,270	C
8,483,000	279,126,243	238,929,084	115,540,311	86,982,660	39,098,240	22,978,539	2.96—1	3.78—1	76,442,071	64,004,121	
1,865,000	92,597,654	83,803,414	52,900,692	48,927,588	19,498,703	14,682,085	2.71—1	3.33—1	33,401,989	34,245,503	
3,325,000	268,883,640	261,080,727	68,524,095	64,739,692	23,554,198	15,095,878	2.91—1	4.29—1	44,969,897	49,643,814	
2,090,000*	160,801,904	149,080,637	46,119,078	29,124,921	23,658,376	13,707,101	1.95—1	2.12—1	22,460,702	15,417,820	
4,398,000	163,113,209	143,616,863	79,528,779	59,503,686	30,343,039	20,583,141	2.62—1	2.89—1	49,185,740	38,920,545	Cr
1,494,000[20]	153,255,428	140,569,330	58,180,817	43,747,588	26,481,202	19,034,418	2.20—1	2.30—1	31,699,615	24,713,170	
71,338*	106,137,157	89,603,212	36,243,284	21,703,745	12,968,948	10,776,727	2.79—1	2.01—1	23,274,336	10,927,018	
4,400,700[21]	140,465,253	116,864,341	55,153,998	31,655,121	21,977,410	14,110,084	2.51—1	2.24—1	33,176,588	17,545,037	
1,772,500*	53,358,950	48,209,990	24,654,781	22,549,467	16,370,378	17,670,294	1.51—1	1.27—1	8,284,403	4,879,173	
4,459,000	163,816,319	135,854,963	88,833,861	57,414,142	40,112,371	20,702,195	2.21—1	2.77—1	48,721,490	36,711,947	Al
1,065,000	37,754,885	34,794,901	13,582,383	10,551,691	3,819,418	9,641,061	3.56—1	1.09—1	9,762,965	910,630	Nort
2,065,000	44,273,726	41,654,647	24,959,035	21,929,903	8,786,007	8,048,185	2.84—1	2.72—1	16,173,028	13,881,718	
204,725*	29,955,633	26,245,457	12,488,855	10,193,032	3,916,773	2,599,328	3.19—1	3.92—1	8,572,082	7,593,704	
216,000	43,859,941	42,927,457	14,618,021	10,376,215	6,513,454	4,950,340	2.24—1	2.10—1	8,104,567	5,425,875	
602,970	43,490,950	36,751,485	26,126,163	19,324,796	7,524,382	7,378,340	3.48—1	2.62—1	18,601,781	11,946,456	
None	121,975,719	115,300,651	39,008,574	29,488,675	11,509,999	7,736,982	3.39—1	3.81—1	27,498,575	21,751,693	
3,050,000	29,542,694	26,119,396	18,549,922	15,817,946	4,483,994	3,687,798	4.14—1	4.29—1	14,065,928	12,130,148	
6,981,536	37,774,159	31,911,889	19,663,830	16,140,492	6,477,369	5,633,618	3.04—1	2.87—1	13,186,461	10,506,874	
1,600,000	27,625,142	25,118,450	14,072,364	12,029,819	3,529,535	2,599,723	3.99—1	4.63—1	10,542,829	9,430,096	
806,415	17,922,630	10,990,318	9,086,645	6,799,097	3,283,844	2,532,625	2.77—1	2.68—1	5,802,801	4,266,472	
1,938,000	27,338,590	22,156,109	12,550,006	9,750,110	4,357,205	3,376,398	2.88—1	2.89—1	8,192,801	6,373,712	
3,922,000	35,713,796	33,178,140	21,026,723	17,521,958	7,861,566	7,433,418	2.67—1	2.36—1	13,165,157	10,088,540	
1,825,000	12,869,530	13,080,641	8,044,209	8,250,521	2,803,838	3,697,416	2.87—1	2.23—1	5,240,371	4,553,105	
556,232,375	$11,947,760,531	$10,683,179,817	$5,223,817,736	$4,294,767,637	$2,009,669,194	$1,604,957,687	2.60—1	2.68 —1	$3,214,148,542	$2,689,809,950	

ons.
company's operations in-
l ingot capacity.

[14] Restated to reflect 2 for 1 common stock split in 1955.
[15] Includes $10,300,000 set aside for future income taxes.
[16] Includes $2,411,500 set aside for future income taxes.
[17] Restated to give effect to 10 per cent common stock dividend in 1955.

[19] Stock dividends in common declared or paid.
[19] Includes two classes of preferred stock.
[20] Includes set-asides of $3,228,000 in 1955 and $3,162,000 in 1954 for future income taxes.

[21] Includes set-asides of $3,9 1954 for future income taxe
[22] Includes $1,411,500 set asi

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Compiled by **STEEL**

April 2, 1956

	Net Sales 1955	Net Sales 1954	Net Profit—Per Cent of Net Sales 1955	Net Profit—Per Cent of Net Sales 1954	Net Income 1955	Net Income 1954	
59	$4,097,680,287	$3,250,369,279	9.03	6.01	$370,099,353	$195,417,611	United States Steel Corp.
04	2,114,599,636	1,667,377,179	8.52	7.97	180,191,708	132,837,154	Bethlehem Steel Corp.
40	1,188,559,765	846,310,670	7.26	6.25	86,271,491	52,875,164	Republic Steel Corp.
00	696,538,000	492,941,000	7.19	5.08	50,104,000	25,032,000	Jones & Laughlin Steel Corp.
02	622,018,919	481,058,380	7.76	6.27	48,289,453	30,334,871	National Steel Corp.
00	626,232,840	433,406,272	6.66	4.66	41,701,140	20,182,500	Youngstown Sheet & Tube Co.
70	692,683,234	532,045,314	9.29	7.72	64,350,609	41,100,266	Armco Steel Corp.
16	663,317,374	537,024,479	7.91	7.69	52,466,098	41,287,152	Inland Steel Co.
25	257,543,050	250,235,696	4.23	2.82	10,887,163	7,051,729	Colorado Fuel & Iron Corp.[4]
00	249,445,016	190,224,955	6.93	5.04	17,295,711	9,595,740	Wheeling Steel Corp.
33	173,095,949	99,347,910	4.61	3.16	7,987,622	3,134,864	Sharon Steel Corp.
48	136,311,098	128,883,898	4.21	6.15	5,741,236	7,926,666	Kaiser Steel Corp.[4]
41	144,987,476	59,133,532	5.62	2.87	8,148,342	1,694,890	McLouth Steel Corp.
62	237,715,380	160,621,738	5.56	2.31	13,208,602	3,705,952	Crucible Steel Co. of America
07	177,707,556	124,438,118	4.23	1.74	7,515,470	2,170,694	Pittsburgh Steel Co.
24	101,803,010	51,707,937	6.21	1.67	6,317,860	862,528	Detroit Steel Corp.
00	116,293,657	69,265,197	10.84	5.79	12,610,820	4,012,192	Granite City Steel Co.
68	75,084,700	53,484,604	.87	.82‡	655,319	441,212‡	Barium Steel Corp.
97	255,587,054	170,056,405	5.86	2.50	14,985,660	4,246,083	Allegheny Ludlum Steel Corp.
51	51,403,405	35,628,171	8.04	2.86	4,131,969	1,018,754	Northwestern Steel & Wire Co.[5]
06	97,641,729	74,954,710	2.74	2.69	2,672,770	2,014,791	Lukens Steel Co.[6]
38	36,913,883	18,178,502	2.48	.34‡	915,233	62,012‡	Newport Steel Corp.[7]
05	58,375,609	36,085,476	4.37	3.45	2,551,530	1,246,251	Alan Wood Steel Co.
80	78,490,150	49,711,246	3.01	1.41	2,365,459	703,150	Copperweld Steel Co.[8]
20	74,489,168	37,208,043	6.39	2.71‡	4,759,086	1,008,778‡	Lone Star Steel Co.
73	58,191,338	45,364,073	6.95	6.49	4,047,053	2,943,150	Laclede Steel Co.
e	62,020,363	49,332,276	14.14	12.40	8,768,519	6,114,772	Keystone Steel & Wire Co.
50	44,881,747	35,661,856	6.73	5.59	3,022,143	1,993,337	Continental Steel Corp.
e	28,729,529	20,466,960	3.82	3.77	1,097,343	772,527	Atlantic Steel Co.
25	54,370,322	31,643,658	6.94	5.84	3,772,074	1,849,810	Rotary Electric Steel Co.
e	43,999,585	44,898,964	7.94	5.66	3,495,065	2,543,795	Carpenter Steel Co.[4]
e	14,250,562	14,479,935	10.27	9.67	1,462,933	1,400,628	Vanadium-Alloys Steel Co.[4]
74	$13,330,961,391	$10,094,546,403	7.82	5.99	$1,041,888,834	$604,557,019	Total (or average)

Current Liabilities[3] 5	Current Liabilities[3] 1954	Ratio of Current Assets to Current Liabilities 1955	Ratio of Current Assets to Current Liabilities 1954	Working Capital 1955	Working Capital 1954	
7,947	$574,028,605	2.07—1	2.31—1	$695,141,324	$752,013,221	United States Steel Corp.
2,614	302,964,483	3.06—1	2.65—1	809,994,475	500,163,398	Bethlehem Steel Corp.
1,424	98,882,253	3.63—1	3.29—1	256,130,416	226,397,167	Republic Steel Corp.
6,000	67,598,000	2.61—1	2.83—1	165,330,000	123,977,000	Jones & Laughlin Steel Corp.
1,048	88,115,282	2.19—1	2.38—1	123,520,562	121,769,438	National Steel Corp.
8,481	57,081,680	3.23—1	4.21—1	218,104,489	183,084,512	Youngstown Sheet & Tube Co.
2,417	76,904,049	2.72—1	2.92—1	182,802,349	147,783,281	Armco Steel Corp.
5,217	68,906,364	2.84—1	3.30—1	165,895,150	158,151,492	Inland Steel Co.
3,797	31,821,277	2.60—1	2.90—1	66,703,600	60,603,270	Colorado Fuel & Iron Corp.[4]
8,240	22,978,539	2.96—1	3.78—1	76,442,071	64,004,121	Wheeling Steel Corp.
8,703	14,682,085	2.71—1	3.33—1	33,401,989	34,245,503	Sharon Steel Corp.
4,198	15,095,878	2.91—1	4.29—1	44,969,897	49,643,814	Kaiser Steel Corp.[4]
8,376	13,707,101	1.95—1	2.12—1	22,460,702	15,417,820	McLouth Steel Corp.
3,039	20,583,141	2.62—1	2.89—1	49,185,740	38,920,545	Crucible Steel Co. of America
1,202	19,034,418	2.20—1	2.30—1	31,699,615	24,713,170	Pittsburgh Steel Co.
8,948	10,776,727	2.79—1	2.01—1	23,274,336	10,927,018	Detroit Steel Corp.
7,410	14,110,084	2.51—1	2.24—1	33,176,588	17,545,037	Granite City Steel Co.
0,378	17,670,294	1.51—1	1.27—1	8,284,403	4,879,173	Barium Steel Corp.
2,371	20,702,195	2.21—1	2.77—1	48,721,490	36,711,947	Allegheny Ludlum Steel Corp.
9,418	9,641,061	3.56—1	1.09—1	9,762,965	910,630	Northwestern Steel & Wire Co.[5]
6,007	8,048,185	2.84—1	2.72—1	16,173,028	13,881,718	Lukens Steel Co.[6]
6,773	2,599,328	3.19—1	3.92—1	8,572,082	7,593,704	Newport Steel Corp.[7]
3,454	4,950,340	2.24—1	2.10—1	8,104,567	5,425,875	Alan Wood Steel Co.
4,382	7,378,340	3.48—1	2.62—1	18,601,781	11,946,456	Copperweld Steel Co.[8]
9,999	7,736,982	3.39—1	3.81—1	27,498,575	21,751,693	Lone Star Steel Co.
3,994	3,687,798	4.14—1	4.29—1	14,065,928	12,130,148	Laclede Steel Co.
7,369	5,633,618	3.04—1	2.87—1	13,186,461	10,506,874	Keystone Steel & Wire Co.
9,535	2,599,723	3.99—1	4.63—1	10,542,829	9,430,096	Continental Steel Corp.
3,844	2,532,625	2.77—1	2.68—1	5,802,801	4,266,472	Atlantic Steel Co.
7,205	3,376,398	2.88—1	2.89—1	8,192,801	6,373,712	Rotary Electric Steel Co.
1,566	7,433,418	2.67—1	2.36—1	13,165,157	10,088,540	Carpenter Steel Co.[4]
3,838	3,697,416	2.87—1	2.23—1	5,240,371	4,553,105	Vanadium-Alloys Steel Co.[4]
9,194	$1,604,957,687	2.60—1	2.68 —1	$3,214,148,542	$2,689,809,950	Total (or average)

[1] Stock dividends in common declared or paid.
[2] Includes two classes of preferred stock.
[3] Includes set-asides of $3,228,000 in 1955 and $3,142,000 in 1954 for future income taxes.
[4] Includes set-asides of $3,926,000 in 1955 and $4,451,000 in 1954 for future income taxes.
[5] Includes $1,411,800 set aside for future income taxes.

(*Concluded from page 92*)

neers. He succeeds Dr. Harry B. Osborn, technical director of Tocco Division, Ohio Crankshaft Co., Cleveland. The society also elected four new vice presidents, a secretary and a treasurer.

NEW ADDRESSES

Metal & Thermit Corp. is moving its executive offices to more modern quarters at 100 Park Ave., New York 17, N. Y.

National Cylinder Gas Co., has moved its purchasing department from downtown to its plant at 4700 W. 19th St., Chicago 50, Ill.

Trundle Engineering Co., Cleveland, has changed its name to Trundle Consultants Inc. It maintains offices in Chicago and New York in addition to the home office.

REPRESENTATIVES

William R. Morrisey has been appointed sales representative for **Wolverine Tube Division,** Calumet & Hecla Inc., Detroit. He will headquarter in Wolverine's Pittsburgh office.

Yale Materials Handling Division, Yale & Towne Manufacturing Co., Philadelphia, announces appointment of Harold E. Moon manager of its Cincinnati sales and service.

Robert L. Hall Jr. has been appointed wire and cable specialist for **General Electric Co.'s** midstates construction materials district. His offices will be in Cincinnati.

S & W Electric Co. has been appointed representative for the **Feedrail Corp.,** New York, manufacturers of industrial trolley busway electrification systems. Territory: Montana, Idaho, Wyoming, Utah, Colorado and New Mexico. S & W's offices are in Denver.

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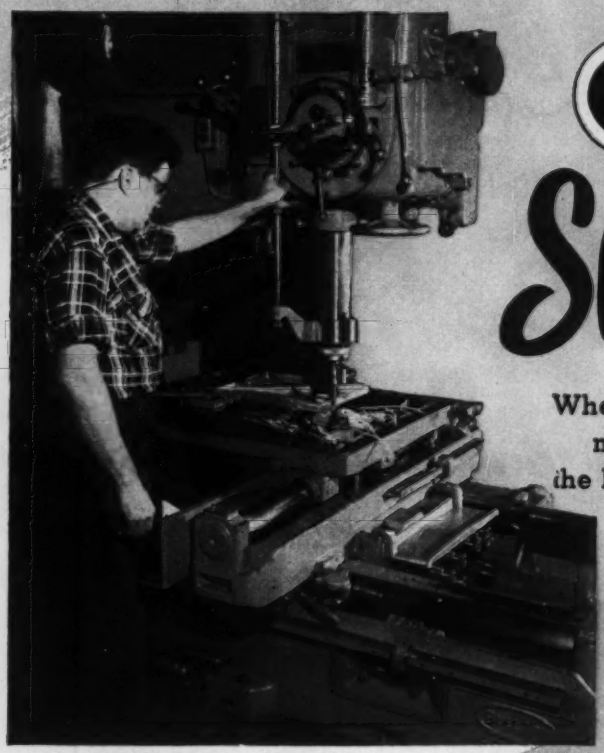


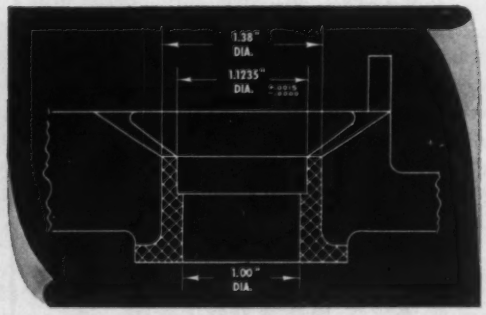
BULLARD Spacer Table

Where close tolerances must be maintained on repetitive pieces the Bullard Spacer Table is a "natural"

"The machine is simple to operate. We have found the Bullard Spacer Table very useful in our work", says a foreman at San Diego Division of Convair. "It eliminates the necessity of zeroing to a set position. And there is no chance for error, which is important when you make accurate parts for airplanes."

This same accuracy to close tolerances can be applied to your drilling, reaming or tapping operations without the high cost of jigs or fixtures.

Identical machining operations on each of three holes for battery carriage are performed on the Bullard Spacer Table.



OPERATION DATA

OPERATION	SET-UP TIME	UNIT TIME
Drill 1" dia.	.70	.2066
Counterbore 1.1235" dia. at 1.000 dia. .350" deep	.25	.0566
Face 1.38" dia.	.25	.0356

CALL YOUR NEAREST BULLARD REPRESENTATIVE OR WRITE FOR SPACER TABLE CATALOG TO

THE BULLARD COMPANY
BRIDGEPORT 2, CONNECTICUT

STEEL
April 2, 1956

Technical Outlook

PUSHBUTTON FINISHING— Automation in barrel finishing takes a big step forward with the development of a fully automatic horizontal machine that fits into straight line production. The self-contained unit being built by Roto-Finish Co., Kalamazoo, Mich., is suited to large volume deburring, scale removal and finishing. Parts are fed by conveyor into the machine, processed, then washed and discharged on conveyor. First use will be in auto industry for deburring steel stampings.

MORE DUCTILE TI— You can reclaim titanium parts that are too brittle by heat treating them. For Ti-140A, heat to 1500° F, cool at 2° F per minute and hold at the stabilizing temperature (1200° F) for a short time. This improves ductility, reduces strength only slightly. Battelle Memorial Institute worked out the method and reports a similar treatment can be used for RC-130B.

SWITCH TO ALUMINUM— A new experimental high-voltage switch (115 kv, 600 amp) uses all-aluminum structural members. The base is of welded sections; top hardware is aluminum castings; the switch blade is annealed aluminum tube with flattened ends. Bearings, crank levers and tie rods all are aluminum and the assembly is fastened with aluminum bolts and nuts. Connectors between the flexible copper conductors and aluminum hinge castings are copper-aluminum bimetals. Benefits of the switch: It's cheaper, lighter and more attractive.

LONG LIVED—Nodular (ductile) iron has up to four times longer service life under elevated temperatures than gray iron castings, says Simonds Saw & Steel Co. The company just completed a two-year study at its Fitchburg, Mass., plant. It credits the greater service life to nodular iron's resistance to oxidation and cracking caused by growth at high temperatures. The company is using nodular iron for pots, furnace doors, frames and furnace forms which were cast of gray iron.

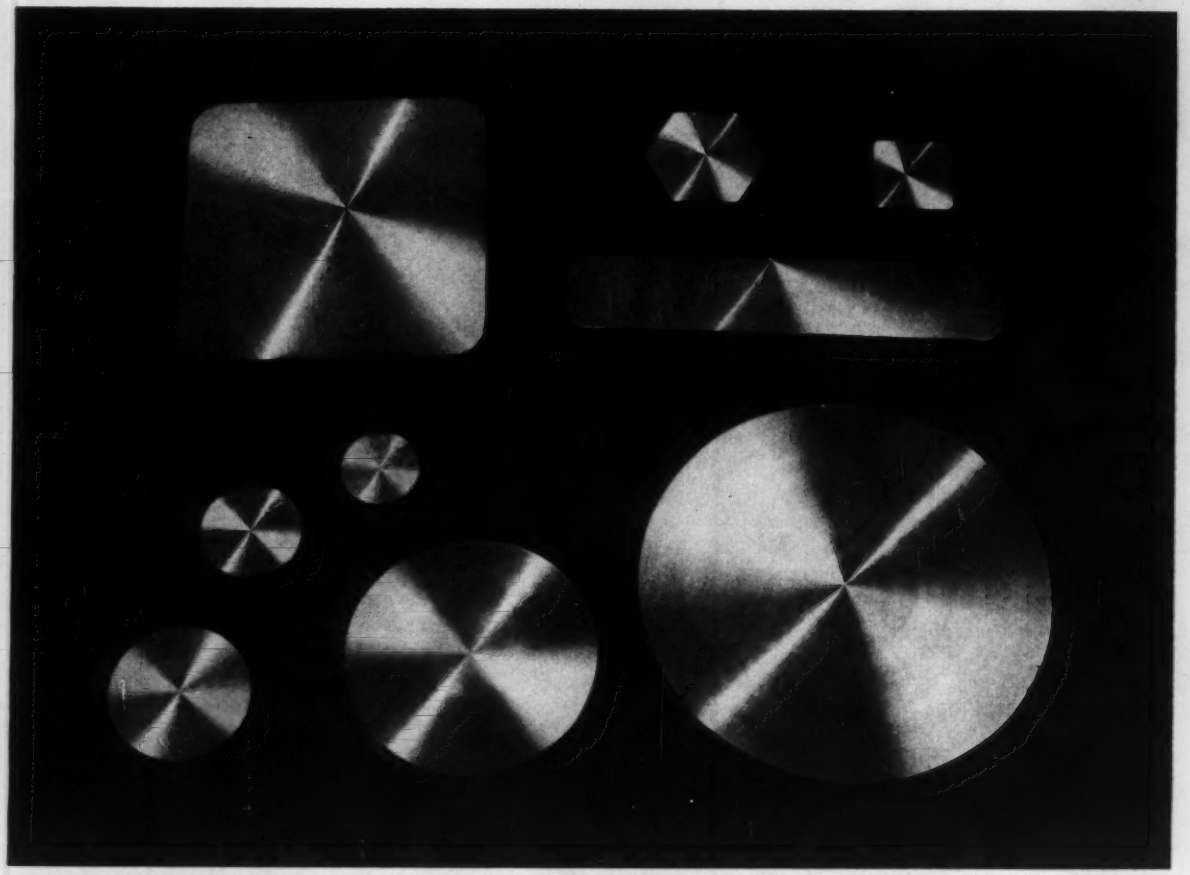
TI-CLAD— Keep your eye on steel with an overcoat of titanium. It's being done on a laboratory scale by a process called Hortonclad. Armour Research Foundation reports that it bends freely whether titanium is in compression or tension.

PRESTRESSED— The Air Force has under study a wing structure of prestressed ceramic materials that is capable of bearing a normal load. Development of efficient ceramic wings for high-temperature service appears possible through prestressing with cables and other devices.

MARKED MEN— Put a white safety helmet on new men during their first 30 days on the job. If they wander into danger areas, they are easy to spot — they won't be mistaken for old hands who know their job. Duquesne Works of U. S. Steel has used the idea for a year and finds it has sharply cut down accidents among new employees.

CLADS AND COLORS— Fluorocarbons, which have a reputation for sticking to nothing, now can be metal clad and coated with printing inks. International Resistance Co. has announced a copper foil-fluorocarbon laminate. Produced without the aid of a resin adhesive, it has possible uses under severe temperature, moisture and electrical conditions. The inks, in 11 colors, and electrically conducting silver were developed by the M. W. Kellogg Co. They can be applied by standard printing and marking methods.

Metalworking Outlook—p. 47 *Market Outlook—p. 125*



These cross sections were cut from aluminum shapes produced by continuous casting. Diameter of round bar (lower right) is 4½-in.

Continuous Casting of Aluminum

A semiproduction unit that uses an oil lubricated graphite mold has been in operation about a year. It handles all aluminum alloys (with grain size control) in a variety of shapes and sizes

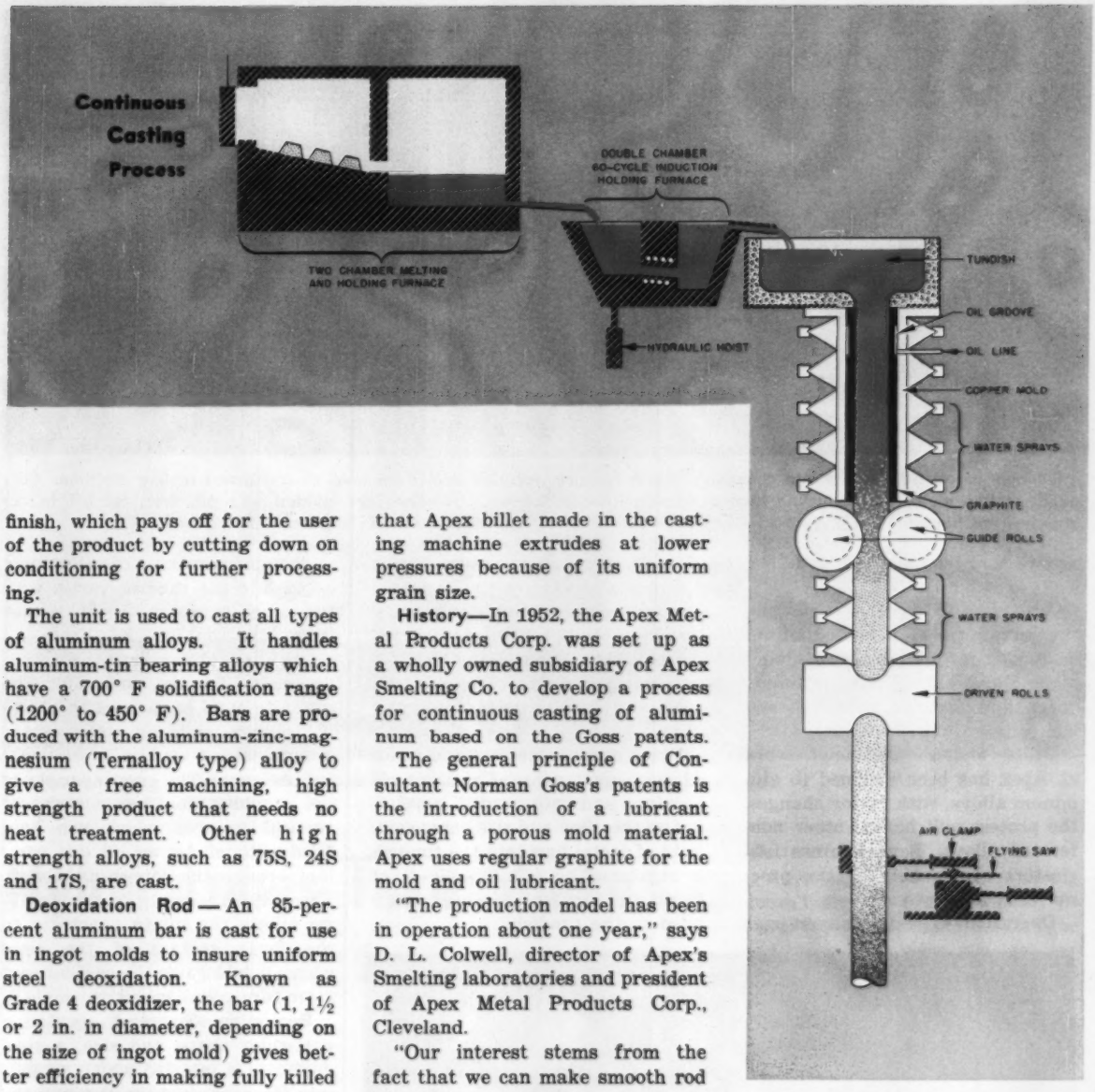
ALUMINUM INGOTS are loaded into a melting furnace at Apex Smelting Co., Cleveland, and 15 ft below a variety of finished shapes (see above) come out continuously.

Advantages of the process, says H. R. Youngkrantz, Apex's chief engineer, are: 1. Speed at which bars, flats, squares and hexagon shapes can be produced. 2. Surface finish is good; no conditioning is required for further working. 3. All aluminum alloys can be handled. 4. Grain size can be controlled to fit the application of the product.

Sizes and Speed — Sizes being cast are: Rounds, ¾ to 5 in. in diameter. Flats, ¾ to 2 in. thick by 5 in. wide. Squares, ¾ to 5 in. Hexagon shapes, 1 to 4 in. across the face.

Casting speed varies with size of piece. Rod, ¾-in. in diameter, comes out at 16 ft per minute (500 lb an hour). Rod, 5-in. in diameter, is produced at 1½-ft a minute (1 ton an hour). Production of other shapes is in proportion to these rates.

Surface Finish—A novel feature of the Apex process is a patented, oil-lubricated graphite mold. It gives cast shapes a smooth surface



finish, which pays off for the user of the product by cutting down on conditioning for further processing.

The unit is used to cast all types of aluminum alloys. It handles aluminum-tin bearing alloys which have a 700° F solidification range (1200° to 450° F). Bars are produced with the aluminum-zinc-magnesium (Ternalloy type) alloy to give a free machining, high strength product that needs no heat treatment. Other high strength alloys, such as 75S, 24S and 17S, are cast.

Deoxidation Rod — An 85-percent aluminum bar is cast for use in ingot molds to insure uniform steel deoxidation. Known as Grade 4 deoxidizer, the bar (1, 1½ or 2 in. in diameter, depending on the size of ingot mold) gives better efficiency in making fully killed steel than conventional shot, some steelmakers say.

"This composition has poor casting characteristics and can only be produced in bar form by our method," says Mr. Youngkrantz. Deoxidizing grades 1, 2 and 3 also are cast.

Grain Size—Fig. No. 5 shows examples of grain sizes that can be produced. They can be varied from large to small by regulating speed of casting and the temperature of the hot metal going into the graphite mold.

In bearing alloys, a small grain is essential. For free machining alloys, a uniform, medium grain is preferred. Extruders report that Apex billet made in the casting machine extrudes at lower pressures because of its uniform grain size.

History—In 1952, the Apex Metal Products Corp. was set up as a wholly owned subsidiary of Apex Smelting Co. to develop a process for continuous casting of aluminum based on the Goss patents.

The general principle of Consultant Norman Goss's patents is the introduction of a lubricant through a porous mold material. Apex uses regular graphite for the mold and oil lubricant.

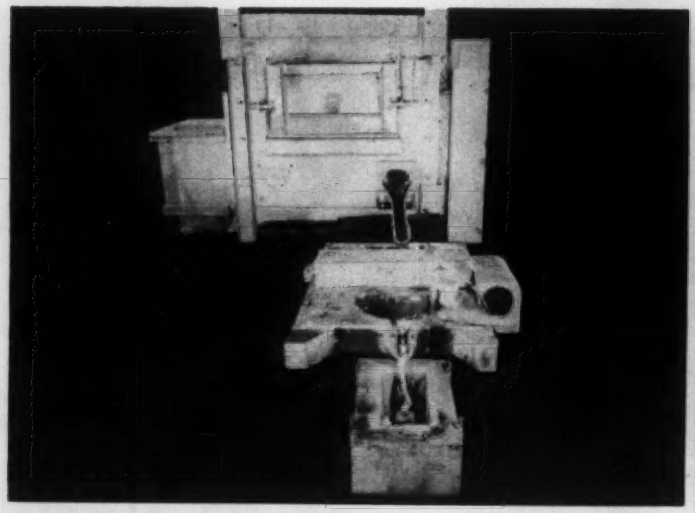
"The production model has been in operation about one year," says D. L. Colwell, director of Apex's Smelting laboratories and president of Apex Metal Products Corp., Cleveland.

"Our interest stems from the fact that we can make smooth rod of modern strong alloys at a rapid rate. The process is not 'alloy-sensitive'—the best alloy for the intended use can be produced in the form needed. For example, high strength alloys that do not require heat treatment can be cast," he points out.

Outlook—"We have drawings almost completed on a larger, more rigid casting machine capable of casting rods of extrusion billet size (8 in. or larger)," Mr. Colwell told STEEL.

"Also, we expect to cast tubes in this new machine. When made from extrusion alloys, they will be used as cored billets. In bearing alloys, obviously, tubing is a more

Continuously cast aluminum alloy bars ready for shipment



Aluminum ingots are loaded into a sloping hearth furnace (top) which sends molten metal into induction heated holding furnace (center). It supplies the tundish

Lower level of continuous casting machine. Sections are guided into pit, then cut off to required length by flying saw

satisfactory shape than rod," he said.

Apex has its eye on expanding the metallurgical use of continuously cast rod by producing aluminum alloys containing titanium, boron and perhaps zirconium and manganese.

Other Metals — Although work at Apex has been confined to aluminum alloys, with minor changes, the process will handle other nonferrous alloys. Several brass fabricators are looking at the process with interest.

Operation—The diagram on page 97 shows how the proces works. Aluminum ingots are loaded into a sloping hearth melting and holding furnace. Molten metal flows from the holding section of this furnace into another double chamber, 60-cycle, induction-heated holding furnace.

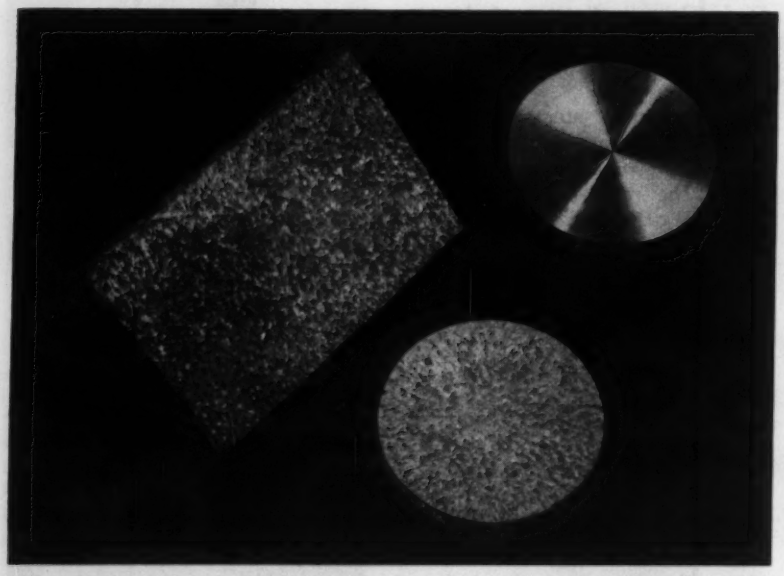
This furnace supplies the tundish with molten metal at the temperature and rate needed, depending on the alloy and size being cast. Rate of metal flow into the tundish is regulated by a hydraulic hoist to tilt the furnace. No heat is applied to the tundish.

The temperature of aluminum going into the tundish varies with the alloy being cast. It ranges from 1160 to 1300° F. From the tundish, metal goes into the graphite mold directly under it. The graphite mold is encased in a copper outside mold on which water is sprayed for cooling.

Lubricant—The upper part of the graphite mold has a series of vertical grooves which are kept filled with oil by an oil line coming through the copper mold wall. The natural porosity of the graphite allows the oil to penetrate to the inner surface of the mold where it lubricates the casting part as it forms and moves through it.

Beginning—To start up for a particular shape and size, a steel duplicate is inserted which extends into the tundish down through the mold to make contact with pull rolls. The initial aluminum shape forms above this steel starter part and is pulled through the machine.

The aluminum shape leaves the mold, passes through guide rolls, then is contacted by pull rolls. Shapes are guided into a pit. An air clamp holds the section while it is cut off to the length desired (usually a 10 ft or 12-ft piece) by a flying saw that operates a little above floor level.



Etched sections show grain size uniformity. Grain size can be controlled by regulating temperature of metal going into the mold and the speed of casting. Small grains are needed for bearing alloys, larger grains for machining alloys

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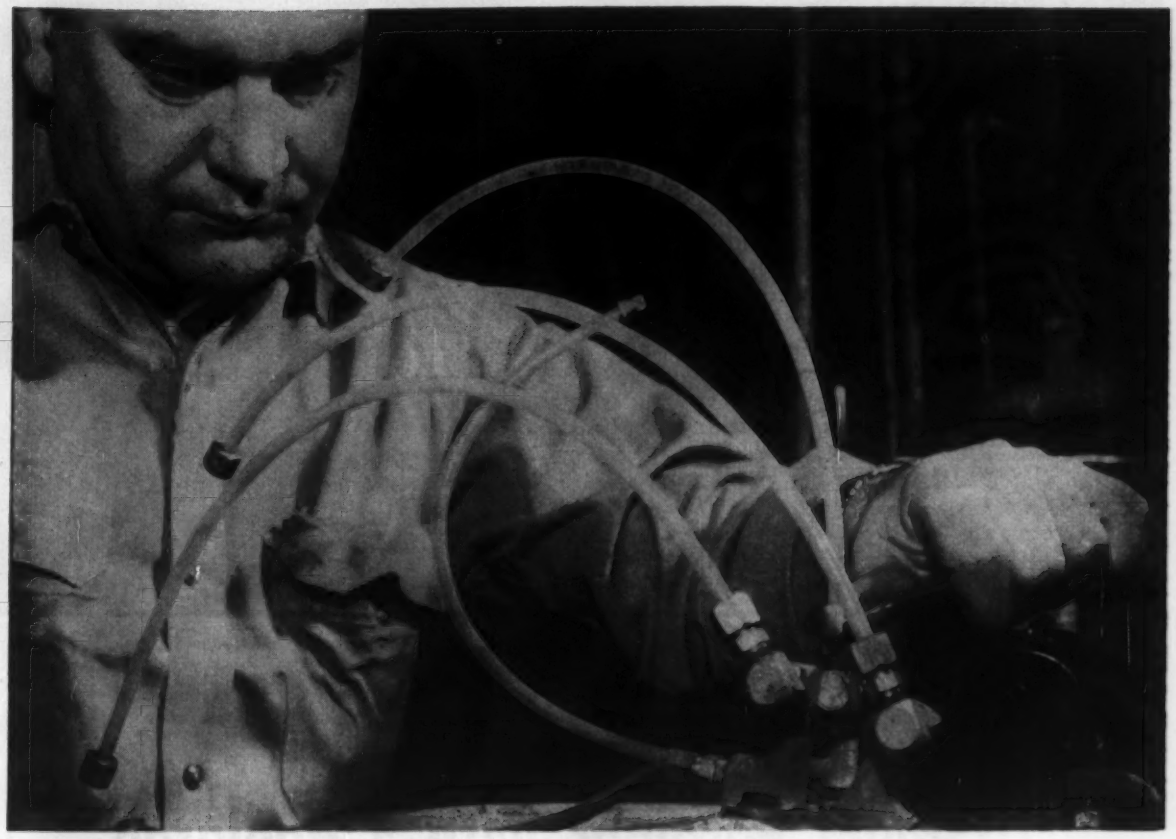


Nylon tubes take standard tube fittings like these. Tubes are unaffected by air, water, solvents, greases and lubricants found on machinery

Nylon Tubes Take Shake

Vibration is a big problem in the life of a flexible coupling. Nylon tubing in this plant has lasted 25 times longer, shows no sign of weakening

> Nylon tubing for machinery will be demonstrated by the Polymer Corp. at the annual meeting and exhibit of the American Society of Lubrication Engineers, William Penn hotel, Pittsburgh, Apr. 4-6.

IF you have a problem keeping vibrating parts connected with flexible tubing, you can solve it with tubes made of nylon. That's what the National Can Co., Chicago, did on its big, 400-per-minute, can-making machines.

Uses—The canmaker (called a body maker) has four parts: An arm, slide, lever and carriage that cycle at the 400-per-minute clip. Each part requires lubrication which is carried from the fixed base to the moving part by flexible tubes. It was too much for the older tubing which ruptured in two weeks. Nylon tubes still are going strong after a year.

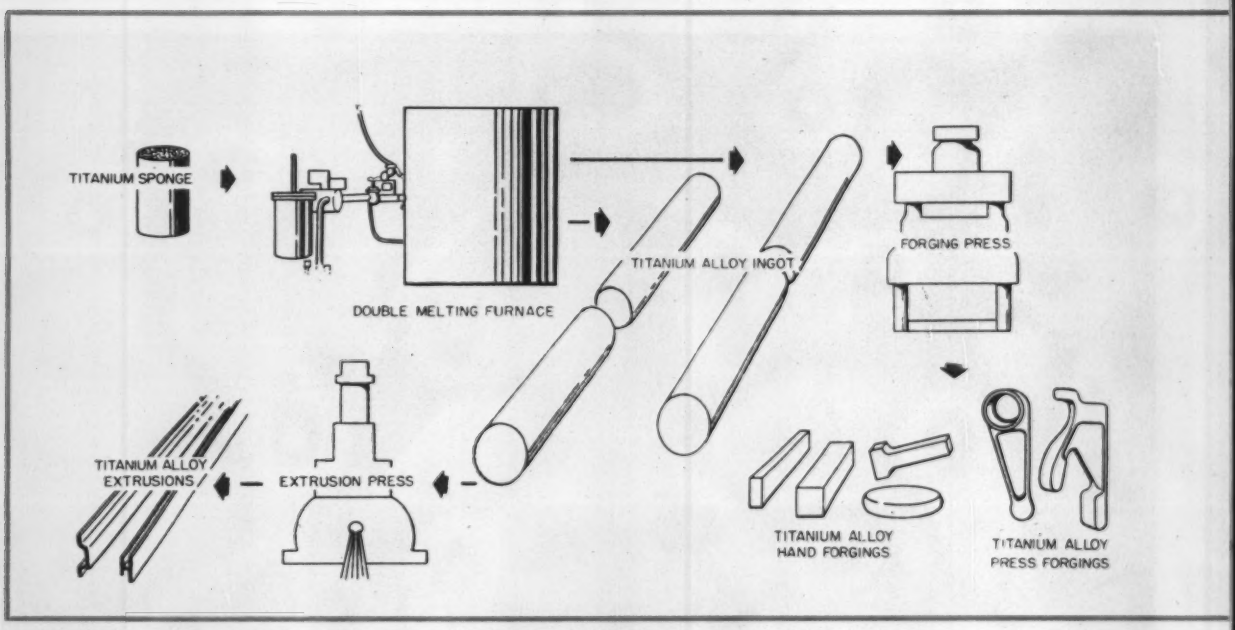
National Can Co. also uses nylon tubes to carry plastic spray, compressed air and water to coat the inside of cans. The former tubing required large connectors which interfered with the spray. Nylon tubing connectors are two-thirds smaller, have the same fluid carrying capacity.

Six Hamilton punch presses cycle 250,000 times a day. Nylon tubing is used to carry lubricant from a central system and for compressed air. Again, nylon lasts 50 times longer.

Advantages — Nylon tubing doesn't plug or foul so quickly as other types. It resists flex fatigue and has a high burst strength per weight unit. It doesn't dent or collapse under impacts that crush metal tubes. It can withstand temperatures up to 475° F, but the maker (the Polymer Corp. of Penna., Reading) recommends temperatures under 180°F.

In the ¼-in. size, the tubing (called Nylaflow) can be bent on a radius of 2½-in. It is easy to cut and install and uses standard tube fittings. Wall thickness of 0.050-in. will withstand 2500 psi.

The Polymer Corp. claims these advantages when used on the vibrating parts of machinery: 1. Increased tubing life under concentrated flexing. 2. Elimination of machine down time for tubing replacement. 3. Reduction of maintenance time. 4. Smaller diameters of tubing can be used. 5. Fitting and connector problems are simplified.



Constant control from sponge through fabrication produces . . .

Titanium Forgings with a Pedigree

THE FIRST integrated facility to produce titanium press forgings and extrusions is going into operation at Harvey Aluminum, Torrance, Calif.

Sponge will be converted into ingot in a consumable-electrode, double-melting furnace that uses a vacuum in both phases.

Aircraft Quality—"Months of experimentation with a pilot facility have convinced us that the best way to maintain process control of aircraft-quality titanium is to produce our own ingot," says Leo M. Harvey, president.

Already an established producer of wrought aluminum mill products for the airframe industry, Harvey is aiming at the same market for its titanium alloy forgings.

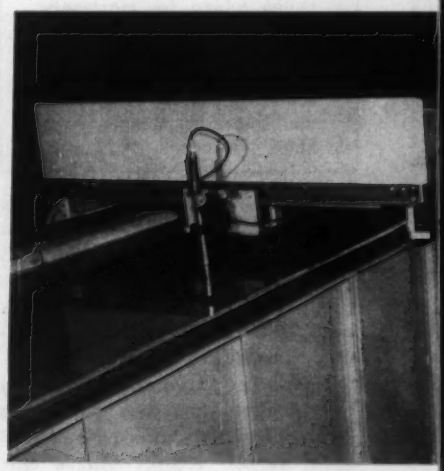
Typical aircraft components the company will produce from titanium include forgings and extrusions for compressor rotor blades, engine rings, fasteners, impellers, structural members, attachments and AN fittings.

Advantages—As an integrated operator, Harvey gains two advantages—quality control and inventory control. Titanium requires rigid control to maintain the metallurgical properties needed for airframe and jet engine components. Proper blending and alloying of the sponge are necessary to get uniform properties and good working characteristics in the ingot.

The same properties are carried through the fabricating operations and determine the quality of the finished product. Through integration, the stock used in every forging operation has a complete, recorded metallurgical history.

No Tie-Ups—In inventory control, the integrated facility speeds up delivery time to the customer, does not tie up "pipeline" metal. Greater economy is gained since al in-process material is recovered and remelted to its original purity.

To turn out titanium closed-die forgings, hand forgings and hand forged shapes, Harvey will use its big battery of hydraulic and me-



Ultrasonic apparatus is used to check

Harvey is installing a battery of new presses for forging titanium and aluminum. The largest is an 8000-ton capacity hydraulic unit

chanical forging presses, largest of which has 8000 tons of capacity.

Complete facilities for all secondary operations, plus facilities for machining forgings, have been set up. The company installed new analytical equipment, ultrasonic apparatus, mechanical property testing devices and metallographic equipment in its metallurgical laboratory.

internal quality of titanium forgings

Distributors Aim at Replacement

Machine tool salesmen will tackle job of selling to replace current equipment. Part of their new job will be to sell top management on the evils of obsolescence

IF YOU want to know how the battle's going, you check with the men on the firing line. It's as true in business as it is in war.

The "firing line" of the machine tool industry got together recently at the spring meeting of the American Machine Tool Distributors' Association in Detroit.

In a nutshell, the battle is being won. Machine tool sales look to continue at or near present high levels through 1956. A few enthusiasts are even willing to go out on a limb for a good '57.

Cushion—With a healthy chunk of business coming from a bustling economy, distributors (and builders) think this is the time to be selling to the replacement market. This is their biggest plum. It's also the toughest to sell.

On this they seem to agree. If they can crack the replacement market by convincing metalworking management to get rid of obsolescence as it comes up, the alleged boom-and-bust cycle of the machine tool industry will be history. Obsolescence is not a some time thing.

Answers—The big question, of course, is how to sell replacement. To sell a new machine for a new job is one thing: To sell a new machine against one already on the job is quite another.

A panel made up of a builder, a distributor and a user gave its views. Despite separate interests, it agreed on fundamentals right down the line. It sometimes may be the salesman's job to sell his customer on these fundamentals.

Fault? — C. A. Woodley, vice president-manufacturing, Caterpillar Tractor Co., Peoria, Ill., speaking for top management, accepted some of the blame for reluctant replacement. He told the salesmen: "The past is littered with companies that failed because top management didn't buy the idea of the need for replacement."

Mr. Woodley, J. A. Raterman, president, Monarch Machine Tool Co., Sidney, O., and D. M. Pattison, vice president, Motch & Merryweather Machinery Co., Cleveland, agreed on these checkpoints to sound replacement:

1. A formula is good, but is no substitute for good judgment. Caterpillar, regarded as a progressive in replacement, has modified the MAPI formula.

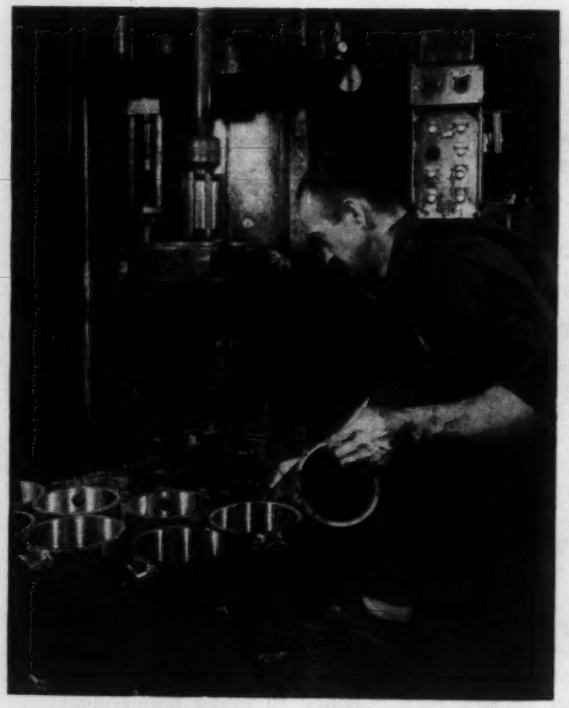
2. Depreciation funds must be set aside to provide for replacement. Mr. Raterman's firm allocates 2½-times the depreciation rate to allow for inflation.

3. It's essential that management knows what it's costing to use present equipment and be informed on alternative methods.

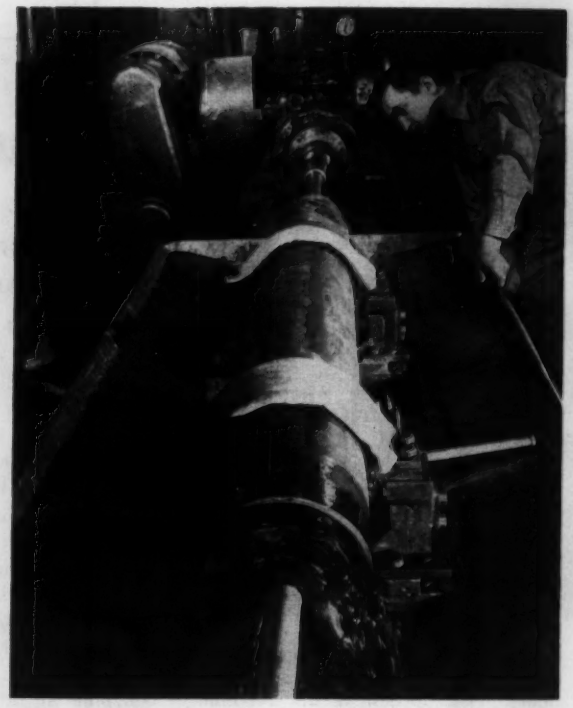
Two responsibilities, says Mr. Woodley, should force management to update equipment. They are: "To keep the product line attractive to the customer," and to see that the "plant is maintained in a modern condition" to produce the product at maximum profit.

Builder to Consult

H. L. Tigges has retired as executive vice president of Baker Bros. Inc., Toledo, O., to enter business as a consultant on machine tools. Mr. Tigges has been president of the National Machine Tool Builders' Association and the American Society of Tool Engineers, and he was director of the Metalworking Equipment Division of NPA in Washington.



Vertical hones are better for short tubes. These 22-in. tubes will be used on hydraulic dump truck hoists



The hone shown will remove 0.045-in. from this 7 in. tube. Most important cost factor: Good quality seamless tube

Roughing to 10 Microinches

Hones do a one-shot job from rough to finish for this firm. Rough turning and semifinish operations aren't always necessary

FROM ROUGH to finish with a hone: That's what Ohio Honing & Hydraulic Co., Cleveland, does to seamless tubing on a production basis. Costs are lower, rejects are negligible and a finish of 10 microinches rms is routine.

Honing changes the diameter of tubing. Abrasive stones, arranged in holders like the spokes of a wheel, are turned against the surface. As the stones turn, they are moved back and forth on the inside of the tube.

The hones at this plant cut 0.045-in. deep and leave the surface exceptionally smooth. In one aircraft application, the surface is better than 3 microinches.

Tubing—Quality is of the greatest importance in rough material. Without it, rough and semifinish boring, turning or grinding would be necessary. In addition, good tubing makes hones last longer, reduces breakage—a high cost factor in any honing operation.

Concentricity, straightness and weldability also contribute to the low costs.

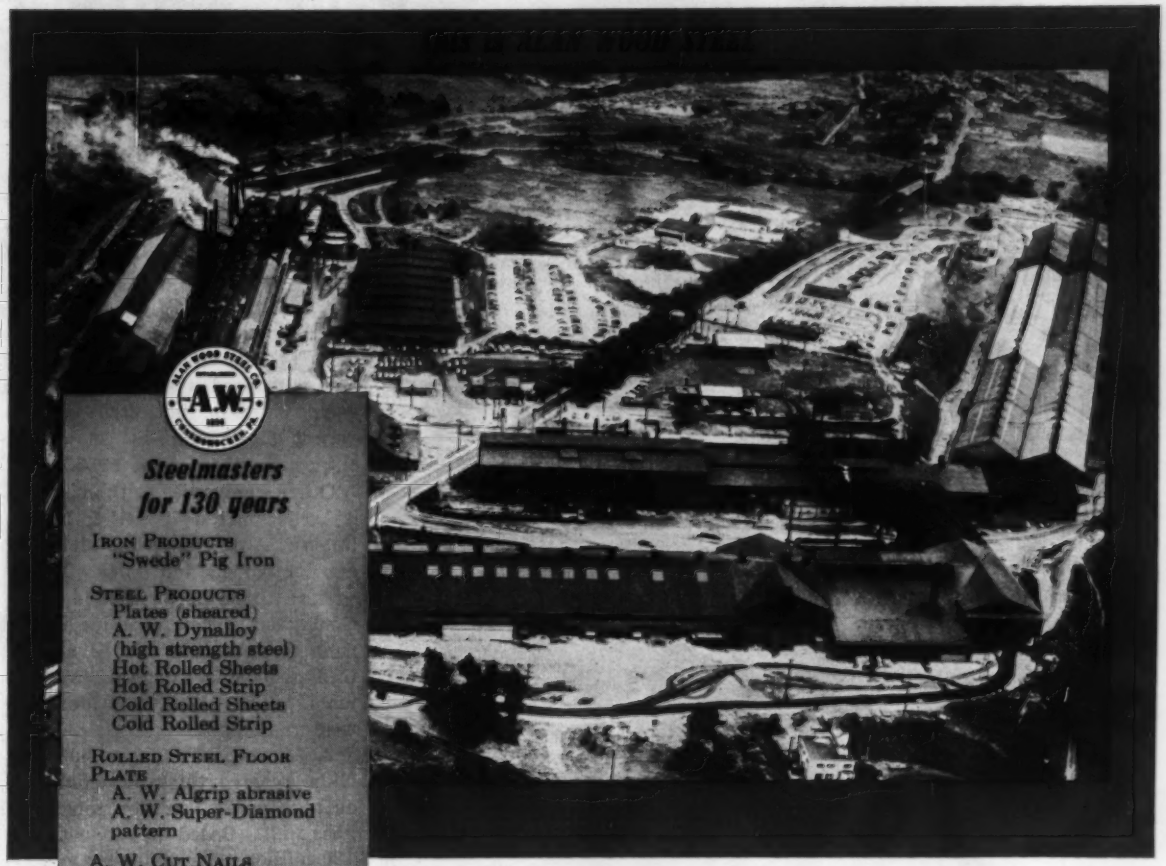
The first step in production is facing the tubing to length. Threading and honing follow. Vertical honing machines are used for tubes up to 60 in. long; all greater lengths are honed on horizontal equipment.

External honing produces this fine finish from mill finished seamless tubing. Surface finishes of 10 microinches are routine

Uses—Finished tubes vary from 1 to 24 in. in diameter and are from 1 to 24 ft long. The smallest ones are used in jet pilot ejection seats; the largest in offshore drilling rigs.

Story—In 1944, Al Blewett, president of Ohio Honing, started a plant that specialized in repairing ice machine tubes. He found that hones did a good job on tubing.

Later, he bought additional equipment, redesigned it to fit his own job, and his firm became one of the first to finish hone rough tubes without intermediate preparation.



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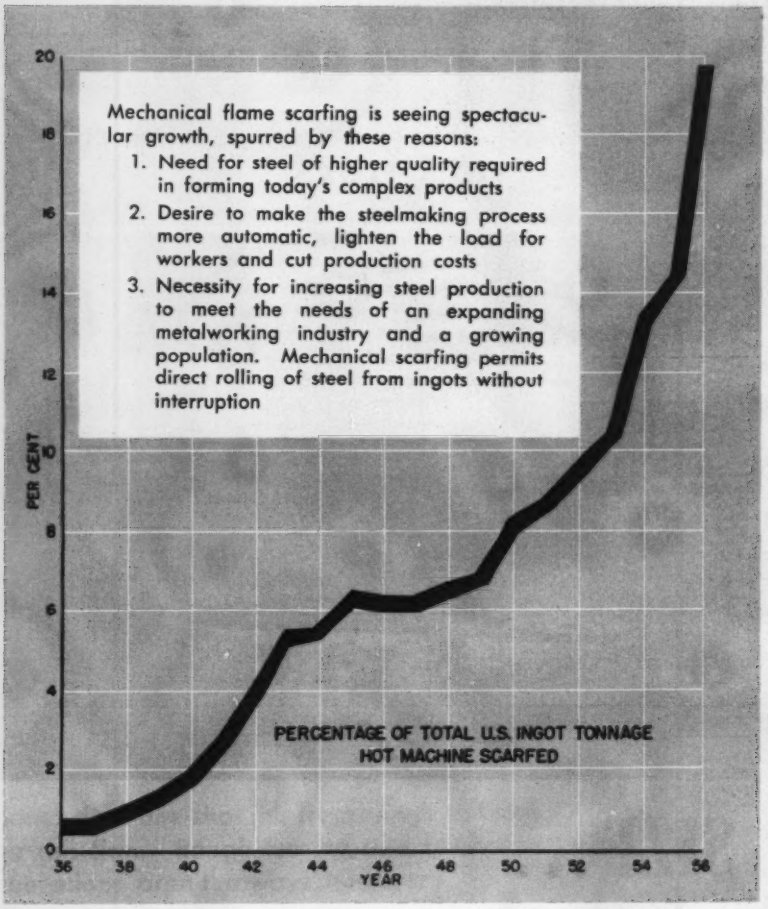

MECHANICAL SCARFING:

The Rush Is On

STEEL's editor-in-chief, Irwin H. Such, gave the International Acetylene Association this picture of mechanical scarfing at its convention in Los Angeles last month

MECHANICAL flame scarfing is playing a star role among improvements in steelmaking. It is invading slab conditioning in earnest. It is getting a foothold in stainless steel. Flame scarfing of nonferrous metals may not be so far off as it seems.

An installation for scarfing steel tube rounds in Germany will be watched with intense interest. The conditioning of cold blooms, billets and slabs may be next, using a flux for flying starts.

Rush Is On—This year, an even dozen machines have been installed or are under construction. Ten are for processing semifinished steel 50 in. and wider.

How much steel will be machine scarfed in 1956 depends on how fast the machines can be installed. Republic Steel Corp. in Cleveland has a new machine for its 44-in. blooming mill, but because of heavy demand for steel, it can't shut down long enough to install it. This scarfer will have to wait for completion of a new slabbing mill (which also will be equipped with a scarfer) that will serve Republic's 98-in. hot-strip mill.

In the Act—New machines already in and running include one for handling slabs up to 64 in. wide at U. S. Steel's Edgar Thomson Works (it began operating in January). Weirton's new machine for slabs up to 50 in. wide went in this month.

A machine for U. S. Steel's 44-in. blooming mill at Gary is scheduled for late 1956. Wheeling Steel has purchased a scarfer to tie in with its 66-in. hot strip mill to permit direct rolling. It will be shipped in the fall of 1956.

Other companies with machines on order include Jones & Laughlin, with two coming for slabs and one for blooms and billets. Northeastern Steel Corp. in Bridgeport, Conn., has a new machine in and running. Another will be shipped to Sharon Steel Corp. in May. Two machines are being considered by western mills.

A Record—Tonnage hot machine scarfed this year could run as high as 23.5 million tons if all goes well. Based on production of 120 million tons of ingots in 1956, nearly 20 per cent will be machine scarfed, a new record.

As ingot capacity expands, a larger portion will be handled on machines. At least eight American companies have signed contracts or are figuring out what equipment is needed. One company with a machine for scarfing the bottoms of slabs is deciding whether to replace it with one for tops and bottoms or for all four sides.

At Detroit—Among the eight is Detroit Steel Corp. It plans to install a scarfer as part of a continuous strip mill revamping job at its Portsmouth, O., works. Ingots are broken down into slabs on a 44-in. blooming-slabbing mill. After shearing, slabs are stacked in a scarfing yard where they cool down and are hand scarfed. Then the slabs are reduced further on a reversing mill and finished on a 4-stand continuous mill with a single coiler.

With the new layout permitting direct rolling without reheating, the slabs will be broken down on the 44-in. mill, machine scarfed,

A BUCK SAYS HE'LL NEVER GET IT ALL BACK IN AGAIN.
ONLY LAST WEEK HE GAVE HIS WIFE THE DEVIL BECAUSE SHE HAD TO PULL SIX THINGS OUT OF HER PURSE TO FIND THE CAR KEYS.
A TEST BOX FELL OUT AND HIT HIM ON THE FOOT, SO HE DECIDED TO REARRANGE ALL THAT JUNK.
JUST LIKE OL' PANDORA'S BOX—
WILKES

That spring cleaning urge

The benefits steelmakers obtain from our refractories are in part a result of Basic's on-the-job servicing. One of the rewards of this close relationship has been the opportunity to observe and appreciate the lighter side of these usually serious craftsmen.

BASIC REFRACTORIES, INCORPORATED

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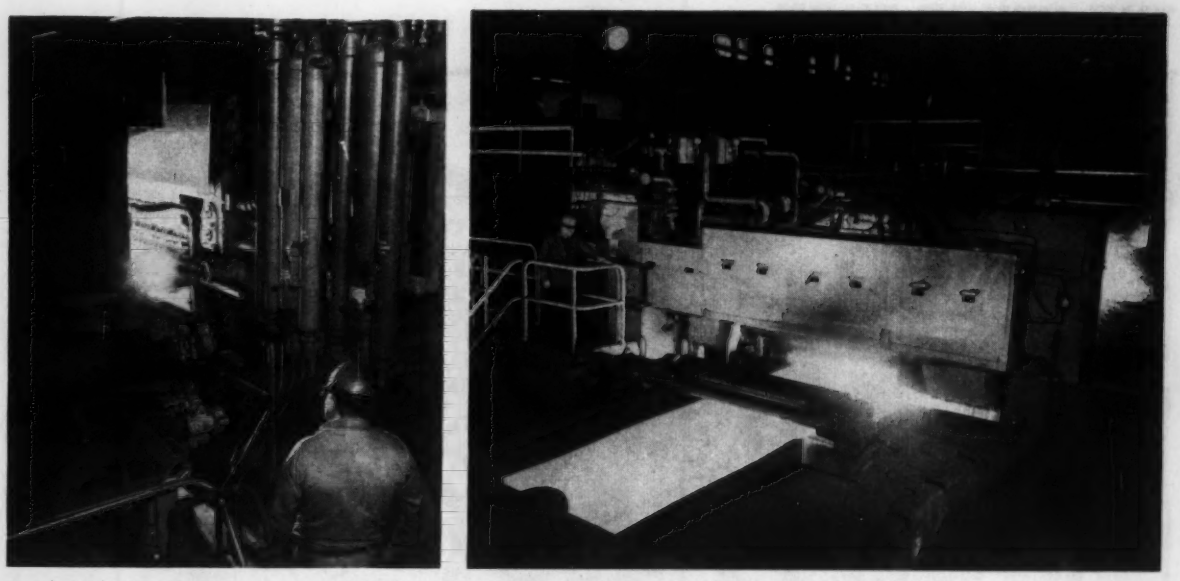


Four-side slab scarfing at Edgar Thomson Works (left) and Homestead Works (right) of U. S. Steel

sheared, transferred through a slab-heating furnace for a fast reheat, reduced on the reversing mill (but not so much as before) and finished on the continuous mill which will get two more stands. A second coiler will be added to provide for expanded capacity.

Detroit Steel is an example of the movement in the steel industry to make processing more automatic, improve quality, increase capacity and lower costs.

Box Score—Even though all mills cannot go to direct rolling, mechanical scarfing still is advantageous. One company with its strip mill a mile or so away from its slabbing mill is adding a scarfer. Conditioned slabs will be loaded on railroad cars for shipment to the strip mill.

Including this year, 55 mechanical scarfers were operating or being installed in the U. S. However, older machines have been replaced by Armco at Ashland, Ky., and by Inland at Indiana Harbor, Ind. A third machine at the Duquesne Works of U. S. Steel became inoperative because of layout conditions. So the score for the U. S. as of Jan. 1, 1956, was 52. Counting the eight definitely planned, there will be 60 mechanical scarfers in the U. S. in the next couple of years, not including those reported in the "thinking" stage.

Abroad — In addition, Canadian mills have two machines in place and a third is pending. Three are in operation or on order in Germany where the steel industry is making a terrific comeback from wartime destruction and dismantling. One machine, the first anywhere for scarfing tube rounds, is for Mannesmann-Huttenwerke.

Another machine for scarfing rounds is in the Johnstown plant of Bethlehem Steel Co. The end product, however, is not seamless pipe. Bethlehem finds it economical to roll squares, convert to rounds ($8\frac{3}{8}$-in. nominal diameter) for scarfing and then convert back to squares for subsequent production of wire products.

The nine scarfing machines in steel plants in the British Isles are for blooms and billets, except one in Wales. It's for scarfing slabs for the Steel Co. of Wales's continuous hot strip mill. Japan has been operating a slab scarfer for about two years. Counting machines both here and abroad, in and pending, there are 76.

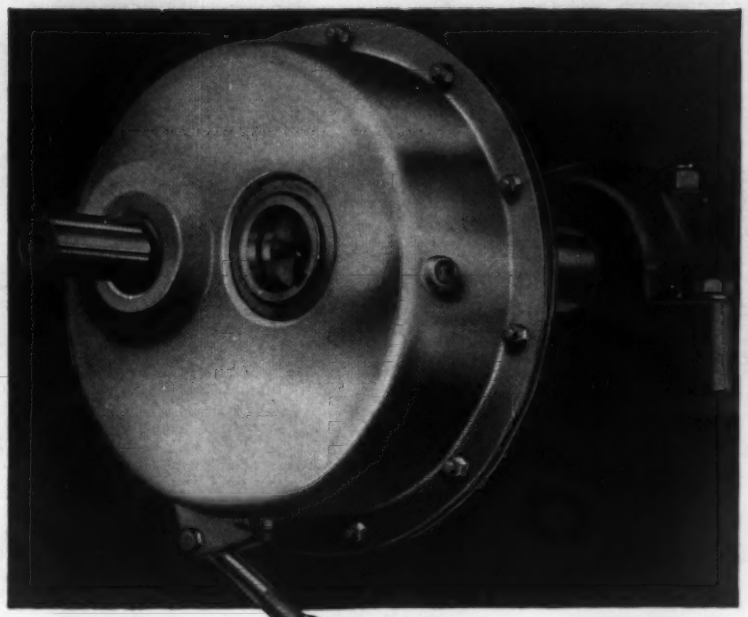
Growth—Wheeling Steel thinks as much as 85 to 90 per cent of the steel off its 45-in. slabbing mill will go through its new scarfer. Armco at Middletown, O., scarfs about 75 per cent and at Ashland about 20 per cent, depending on orders from customers. U. S. Steel machine scarfs 40 to 50 per cent of the steel rolled on mills equipped with scarfers.

If U. S. ingot capacity is 142 million tons on Jan. 1, 1959, and if 25 per cent is machine scarfed, the figure could be roughly estimated at 35.5 million tons. It is possible that 50 per cent more steel will be machine scarfed annually three years from now.

Versatile—The growth in mechanical scarfing is being accompanied by improvements in the equipment. It is being designed more ruggedly and simply with an eye toward: Lower maintenance costs (now estimated at 4 cents a ton for billet machines and 15 to 18 cents for slabbing machines), greater versatility to handle a wider range of sizes and increased efficiency.

Most installations are single machines located downstream from the billet, blooming or slabbing mill and ahead of the shear. Usually, they can be rolled out of the line on their own tracks. Bethlehem has a double scarfing setup at its Lackawanna, N. Y., plant. The first scarfer, a 4-sider, is between its 40-in. blooming mill and its 30-in. mill. The second is between the 40-in. mill and the 21-in. mill.

Earlier machines in the steel industry were fitted with heads for scarfing edges, tops or bottoms. The trend is toward scarfing all four sides. Units for combination blooming, billet and slabbing mills are adjustable for sections rang-



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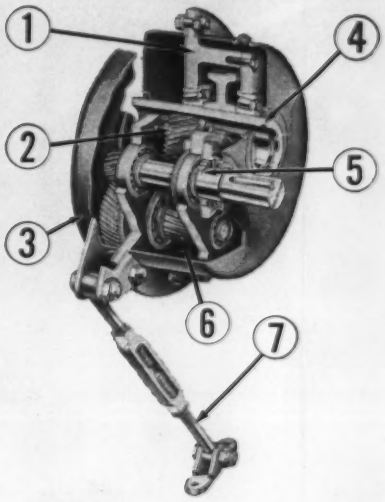

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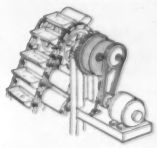
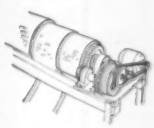
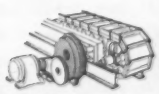
A FEW TYPICAL APPLICATIONS



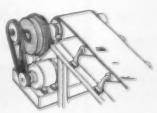
BUCKET ELEVATOR



SAND CLASSIFIER



APRON FEEDER



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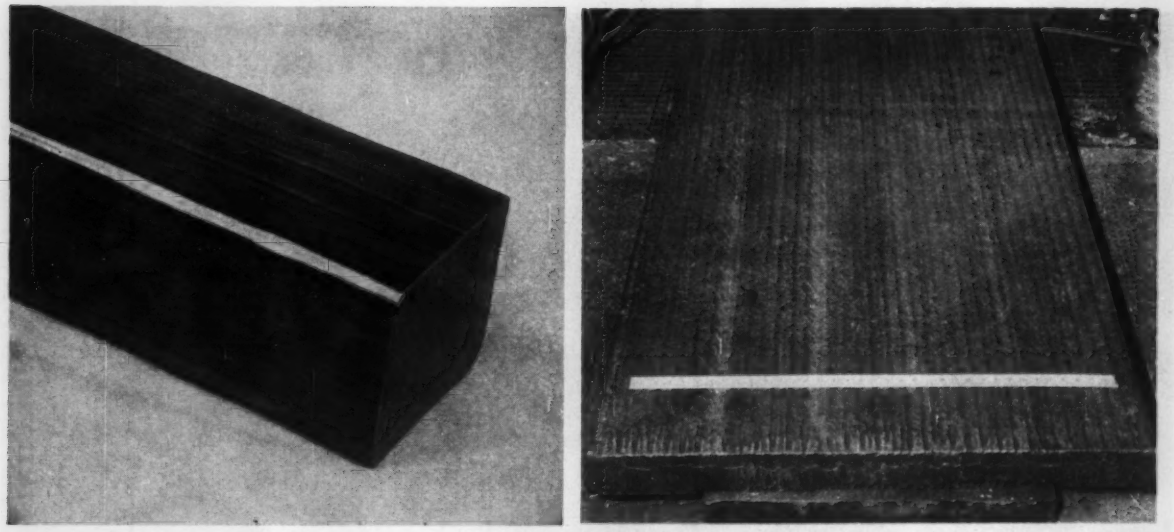

Carbon steel billet and stainless steel slab scarfed on Linde Air Products Co. machines

ing from 6 to 53 in. wide and 2½ to 14 in. thick.

Gas Flow—Recently developed continuous-slot nozzles produce a ribbon of flame resulting in a smooth, flat surface. Ridges produced by older units with individual nozzles are eliminated. Maintenance costs of the new type versus the older one have been reduced 50 per cent. Down time has been slashed 90 per cent. Older type nozzles can be replaced with this new Linde development.

To take care of camber in the material being scarfed, horizontal movement of the nozzles is controlled by air cylinders and vertical movement by a combination of cylinders and counterweights.

Improvements also have been made in auxiliary equipment providing for slag disposal and smoke removal. Distribution systems for oxygen and acetylene have larger capacity needed to handle the volume of gases used by larger machines. Multiplicity of gas tubing is eliminated in later models.

Scarfing Depth—By regulating flow of oxygen and table speed, it is possible to take off a uniform layer of steel from 1/32 to ⅛-in. Most of the surface defects, such as scabs, slight seams, checks and roll marks, can be removed. Some companies scarf as deep as 2½-per cent of cross section. Others figure on about 1½-per cent.

Mills have found through experience how much metal can be removed economically. Where direct rolling is not practiced, they go just deep enough to remove major defects and then complete the conditioning job by hand scarfing. Where the practice is direct rolling, it's a matter of removing enough metal to keep rejects to a minimum.

As one steelmaker puts it: "It's easier to take the skin off a billet or slab and sacrifice some metal than to take the manpower, plus the time and delay, to gouge out the defects by hand."

Savings vary from a few cents a ton where it is necessary to remove only a small amount of metal to perhaps $7 a ton where the material must be completely skin scarfed. A conservative average: $1.50 a ton.

Save—While savings are inherently a part of mechanical scarfing, the question of whether to adopt it depends also on what the steel consumer demands.

One steelmaker expressed the problem this way: "We roll strip in big coils (ten tons or more) at such high speeds no one can see it. Suppose we find a defect as big as a dime? We can't cut it out and the consumer wouldn't take the steel anyway . . . It was clear to us five years ago that we would have to go to mechanical scarfing."

Automobile fenders, cartridge cases and other deep-drawn parts require steel that will take severe forming without rupturing and with a minimum of rejects, but the quality problem applies to products other than deep-drawing steel. Included are tin plate, high-quality plate, forging stock and specialties such as tool, drill, spring and transformer steel. Some mills are scarfing all cold-heading stock because their customers want to cut down on rejected parts.

Variety—One of the newcomers is the free-machining leaded steel developed by the Inland Steel Co. Another is stainless steel. U. S. Steel at its Homestead Works has been machine flame scarfing cold stainless slabs for some years with units fitted with flux attachments. The flux is iron powder which provides higher temperatures. Atlas Steel in Canada also is powder scarfing stainless mechanically.

Last month, U. S. Steel began its first runs of stainless at Homestead through the mechanical hot scarfer that went in last November. Trial runs indicate that at proper temperatures, a good job can be done on conventional stainless steels using iron powder flux. Satisfactory results are reported on straight chromium stainless steels without using the flux.

• *Extra copies of this article are available in quantities from one to three until supply is exhausted. Write Editorial Service,* STEEL, *Penton Bldg., Cleveland 13, O.*

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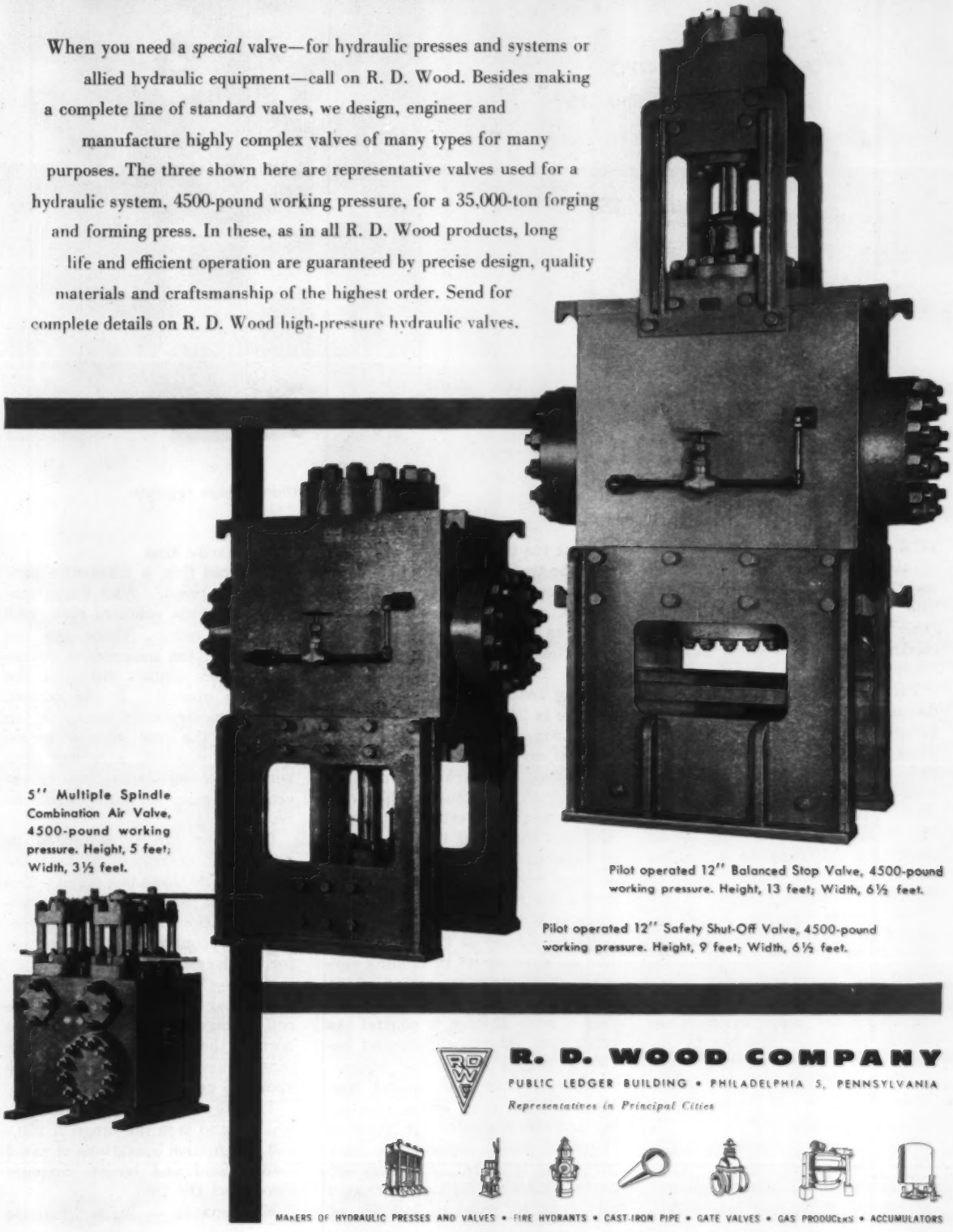

5" Multiple Spindle Combination Air Valve, 4500-pound working pressure. Height, 5 feet; Width, 3½ feet.

Pilot operated 12" Balanced Stop Valve, 4500-pound working pressure. Height, 13 feet; Width, 6½ feet.

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PART IV

By R. M. SILLS
General Electric Co.
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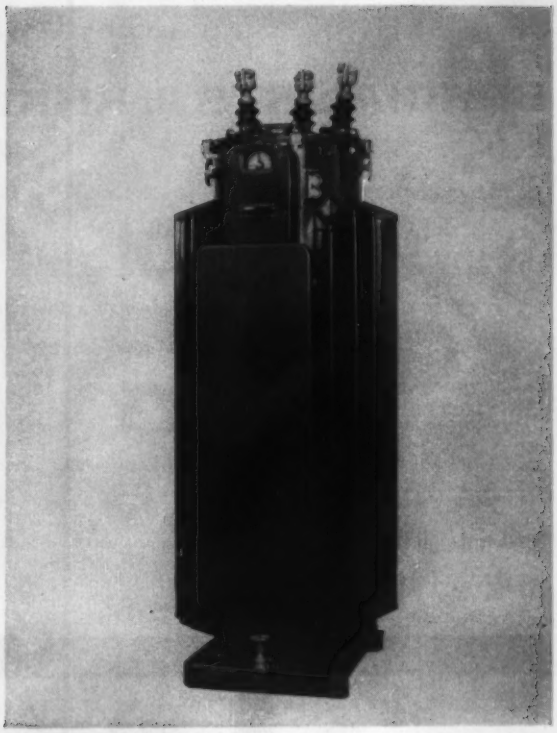
Control Elements



Example of an induction voltage regulator

THE HEAT input to a furnace is regulated by three devices linked together to form a control system: The temperature sensing device (thermocouple); the controller (recorder); and the control element (valve).

Preceding articles in this series discussed temperature control in general, controllers and sensing devices like thermocouples. (STEEL Feb. 13, p. 108; Feb. 20, p. 135; Mar. 26, p. 130). Upon the control element falls all the work of varying the flow of power, gas, oil or electricity. It may be sensitive, but it must be strong enough to handle tremendous energy.

For electric furnaces, control devices may be divided into two categories: Those that turn power on or off and those that vary it.

Contactors, Relays — Magnetic contactors are more common on electric furnaces. Similar to relays, they differ in size. Arc chutes and blow-out coils extinguish the arc when a heavy current is interrupted.

When a contactor is used in the primary of a transformer, the magnetizing input current frequently exceeds the maximum safe make-current for the contactor, especially if the transformer rating is close to the contactor rating. For this reason, contactors are derated as much as 50 per cent when used in the primary of transformers.

Use 115-volt power for controlling contactors. If the supply voltage is 230 or 460, get a control transformer. An adequate kilovolt-ampere rating can be obtained by adding the inrush current of the largest contactor to the holding current of all other contactors. Multiply this total by the control voltage and divide by 3000. Add to this result the power requirements for temperature control instruments and other devices.

Relays—Most of the larger contactors have inrush or holding currents that exceed the rating of the instrument contacts. To overcome this, a relay is used to control the contactor. If the differential between opening and closing temperatures is small and control contacts are not snap acting, the relay and the contactor are likely to chatter. Small differentials may give close temperature control but are a source of high maintenance and tend to promote welding of the contactor tips.

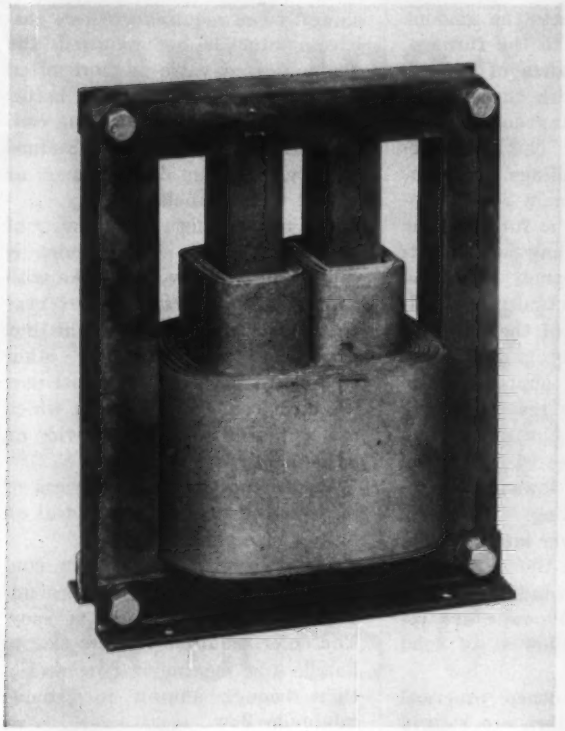
To avoid this, a three-wire connection is used. With these circuits, separate contacts close and open the relay. These are arranged so that momentary operation of each contact will cause the relay to operate. If the control contact momentarily operates (as might be the case when some vibration is present), a definite temperature change is required to operate the relay in the opposite direction.

Contactor life is measured in number of operations at frequencies up to 20 times per minute. The mechanical life varies from 10 million operations for the small, vertical lift contactors to 1 million for the larger, clapper type.

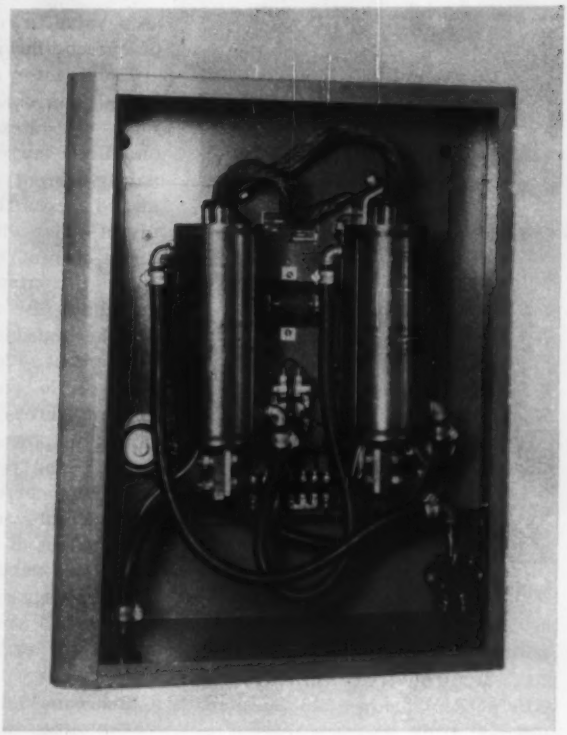
Wear—Contactor life varies with coil voltage. For example, if the coil voltage is 10 per cent above normal, the coil pull will be 21 per cent higher and the hammer blow about 46 per cent greater.

Tip life is less than the mechanical life and is in the range of 250,000 to 1 million operations at rated load. Load and inrush currents also affect the tip.

Maintenance — Inspect furnace



Saturable-core reactor



Totally enclosed, water-cooled ignitron contactor

control contactors on a regular schedule. Clean off any dirt, oil or grease on the contactor and replace worn-out contacts. A slight hum is normal for devices using an alternating-current magnet.

Contacts should not be lubricated—it will shorten their life. Copper and silver contacts become darkened and rough in normal operation, but this does not interfere with their operation or indicate that the contacts should be filed. In fact, normal pitting increases the contact surface, and filing off the bumps may decrease surface below normal. In general, contacts do not need attention during normal life, but if prominent beads form on the surface because of severe arcing, the contact faces may be dressed with a fine file. Do not use sandpaper or emery cloth.

When replacing, adjust contacts for proper wipe and contact force. Wipe occurs from a combined rotary and sliding movement of the tip. During the wiping process, the contact springs compress, providing positive pressure regardless of normal wear.

The most serious trouble that may occur is sticking or welding of the tips. This is one of the most frequent causes of overheated electric furnaces. Proper maintenance reduces sticking; overtemperature protection prevents overheating.

Welding of contact tips is similar to flash welding. Anything that causes the tips to hesitate or operate in rapid succession can cause welding. Trouble may be traced to weak springs, a magnet that bounces, too narrow a differential setting, vibration, insufficient relay interrupting ability which allows the contactor to hesitate, misaligned contact tips or insufficient tip wipe, poor control-power regulation and demand limiting or priority control which may choose the moment the contactors are closing to open the circuit.

If the tips are welded solidly, the trouble will be apparent. However, the tips can weld lightly and later break loose. When this occurs, the evidence is on the tips in the form of small beads.

Mechanical sticking comes from binding of the shaft or bearings, warping of the base or an accumulation of dirt or grease. In vertical lift devices, gums or dirt may prevent free movement. The armature or magnet may bind due to misalignment or from residual magnetism.

Ignitron Contactors — Ignitron tubes are electronic devices used principally for resistance welding service. They consist of a cylindrical, water-jacketed steel shell, with a graphite anode and a pool of mercury for the cathode.

When a current flows through the ignitor (a small electrode touching the mercury pool), enough mercury is vaporized to start the main arc.

A single ignitron is a rectifier. For controlling alternating current, two tubes are connected back to back (push-pull), with each conducting on alternate half cycles. Two tubes connected in this way are called an ignitron contactor.

Ignitron contactors are used as a substitute for magnetic contactors and are especially suitable when frequent operation is required. They are not subject to sticking or welding, are quiet in operation and free from vibration. They require little or no maintenance. Their disadvantages are cost (particularly for 3-phase

Typical solenoid valve

loads) and continuous water cooling. Ignitron contactors are not satisfactory below 100 amperes and 230 volts.

For certain electric furnaces, on-off control is not sufficient and a variable power control is necessary. Ignitrons may be used with a heat control panel or other phase shifting device to accomplish this. Instead of using the ignitrons as a switch, the heat control allows the firing to be delayed until later in the cycle, so that only a portion of each half cycle appears across the load.

Induction Regulators — These have long been used in electric power distribution systems as feeder voltage regulators. Induction regulators are adaptable to electric furnace use. Essentially a form of autotransformer, these units have an extended winding on a rotor. Voltage can either be added to or subtracted from the supply voltage. The kilovolt-ampere rating, hence the cost, increases with the percentage of voltage change. Wide voltage variations are expensive, so they are most often used when small voltage changes (10 or 20 per cent) are adequate.

Induction regulators have been used with tapped transformers as a vernier adjustment between taps.

Saturable Reactors—The saturable reactor is the most common and versatile adjustable voltage control for furnace use. It acts as a valve to regulate the amount of current flowing to the furnace.

The reactor consists of a laminated iron core with three windings—two alternating current and one direct current. The two alternating-current windings are connected across the main power supply in series with the furnace. The direct-current winding is connected to a control panel. With no current in the direct-current winding the impedance of the alternating-current winding is high, and most of the power supply voltage appears across the reactor giving minimum power input to the furnace. The reverse is true when maximum current flows in the direct-current winding. Intermediate values of power input are obtained by varying the current in the direct-current winding. About 4 watts of control power are required for each kilowatt of load power.

Reactors have other practical advantages. Reactors are rugged and are essentially transformers with no moving parts requiring maintenance. Efficiency is high, (98 per cent plus). Easily controlled, even in sizes up to several hundred kilovolt-amperes, they provide a ready method for limiting or regulating load current.

The disadvantage of reactors is cost.

Valves — For gas or oil-fired furnaces, the problem is controlling flow. It can be controlled by varying either the pressure head or the resistance. In virtually all furnaces, the resistance method is used, and the device which accomplishes this is the valve.

Valves most commonly used on fuel-fired furnaces are one of three general types: Butterfly, sliding stem and rotary plug.

The butterfly valve is like the pipe damper used in coal stoves and the choke valve on automobile carburetors. It is inexpensive and has the advantage of low pressure drop in the wide open position. It is admirably suited for two or three position control, although lack of positive shutoff may require an additional valve.

Sliding stem valves are made in a wide variety. The single seated sliding stem valve is similar to a globe valve, providing positive shutoff when required. Where positive shutoff is not required, the double seated valve is more often used, and has somewhat better characteristics for modulating control. Either type may be obtained with various plug designs, such as V-port and parabolic.

The rotary plug valve consists of a ported sleeve or plug which is rotated in the valve body. As with sliding stem valves, the port may be shaped to produce straight line, parabolic, logarithmic or other flow characteristics. Its most useful form contains a curtain which can be moved axially to provide an adjustable port.

Valve Selection—The success of any valve depends a great deal on proper sizing.

For two or three-position control, valve characteristics are unimportant and selection is easy. The chief requirements are size to handle the maximum flow and a tight enough shutoff to provide minimum flow.

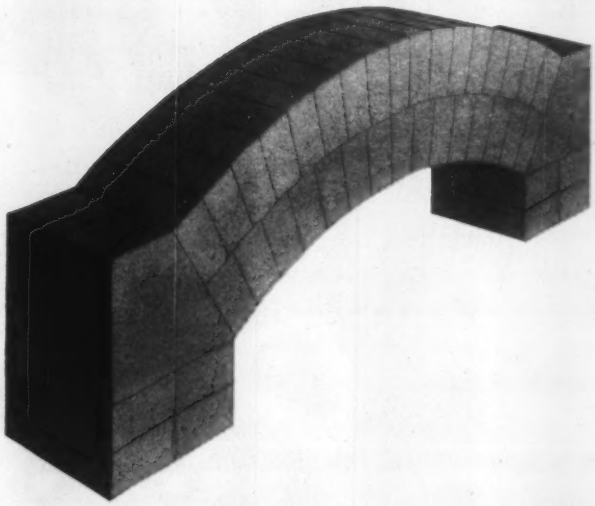
When it provides this, the butterfly valve is well suited because of its low pressure drop and low cost. When positive shutoff is required, a solenoid-operated sliding stem valve is used in series with it. Such a valve also may be used, either alone or in combination with a butterfly valve, to provide a slow increase for smooth lighting.

Modulation — The proper selection of a valve for modulating control is more involved. Extreme conditions must be considered, as well as the flow rate at all intermediate positions. This is called the valve characteristic.

Published data show area characteristics, or flow with constant pressure drop, as when discharging to atmosphere. In use, the valve does not discharge to atmosphere, and its characteristics are different from those published. The downstream resistance increases with flow, reducing the pressure drop across the valve. This is not easy to calculate, so it is necessary to rely on empirical or experimental rules.

The effect of varying pressure drop is minimized by increasing the maximum pressure drop through the valve. This increases the cost and the blower pressure required. A good compromise is

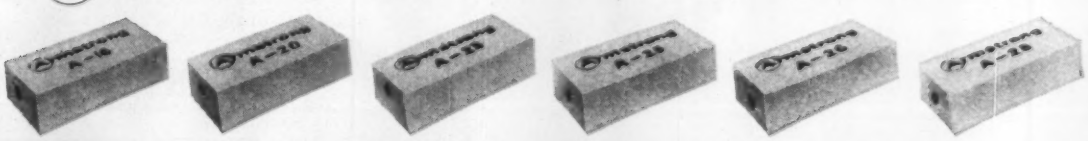
Arches... cut installation time with "tailor-made" arches of Armstrong Insulating Fire Brick



Every brick in an Armstrong "tailor-made" arch is machined to the proper taper for perfect keying action and non-slip fit. They lay up faster, fit exactly, and have a structural stability that cannot be obtained when standard arch or wedge brick are used. The small end of each brick is marked with a colored dot to save laying time and avoid errors. When ordering, just state the span, rise, thickness, and length of arch.

Write for free booklet giving full details on the entire line of Armstrong Insulating Refractories. Address Armstrong Cork Company, 2704 Reed Ave., Lancaster, Pa. Next time you have a furnace building or lining problem, Armstrong engineers will be glad to help you find a practical answer.

Armstrong INSULATING REFRACTORIES



to provide for a drop in the piping of one-sixth of the blower pressure, plus (for modulating valves) a drop of one-sixth of the blower pressure across the valve.

Valve Operators—Control valves may be operated pneumatically, hydraulically or electrically. Probably the simplest is a solenoid, frequently used with small sliding stem valves for on-off control and for automatic shutoff valves. Solenoids are used as pilots to control large, air-operated valves.

Sliding stem valves are used with diaphragm air operators. This type is found in chemical and petroleum plants. For such applications, not only is the sliding stem valve desirable, but pneumatic operation is preferred because of low cost, speed and freedom from explosion hazard.

For furnace work, particularly with butterfly and rotary plug valves, the electric motor operator is popular, particularly where little or no compressed air is used for control.

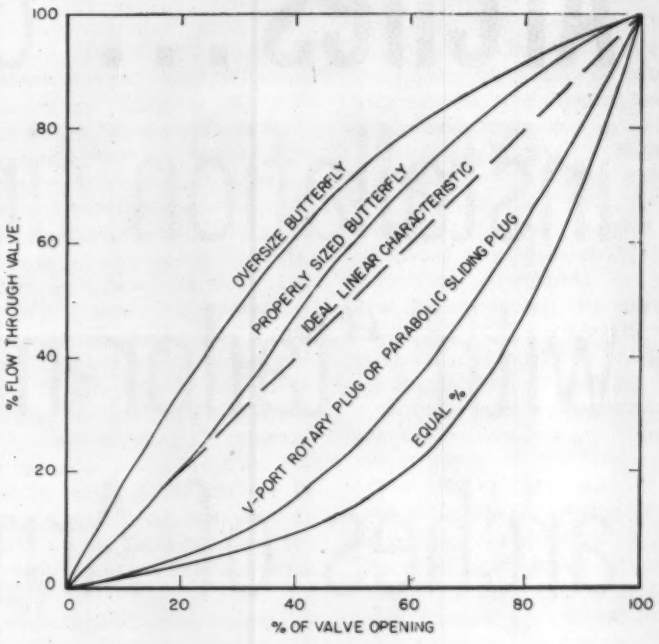
Special Valves—The ratio valve and the safety shutoff valve are important in gas furnace control.

The ratio valve maintains a constant gas to air ratio. The pressure in the downstream side of the valve always will equal the pressure below the diaphragm. The diaphragm side may be connected to the air line, down stream from the control valve, or, if zero gage pressure is required, opened to the atmosphere. The valve then functions as a zero governor.

The safety shutoff valve is a safety requirement on any gas furnace. It is a sliding-stem, globe valve which is both solenoid and manually opened. If power fails, the automatic shutoff prevents gas flow. The safety shutoff also is wired in series with pressure switches in the air and gas lines, so that a drop in either will shut off the gas.

The last two articles in this series (Apr. 30, May 7) will deal with standard and special control systems.

• *Extra copies of this article, one in a series of six on temperature controls, are available in quantities of one to three until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, O.*



Choosing the Right Valve

What is the best characteristic curve for a valve? In most cases, a curve like the upper line above is undesirable. It produces either too much change in flow near the closed position or too little near the open position. If the control works under high input conditions it may seesaw or hunt during low input.

In a furnace, the flue gas temperature increases with flow, causing a drop in efficiency. It is desirable to increase the flow more rapidly as the valve opens, similar to the two lower curves shown. This requires a more expensive valve with a high valve pressure drop. An accurate knowledge of the pressure drops in the system is needed to select the correct valve size. For the majority of furnace installations an approximately linear characteristic is satisfactory.

If the pressure drop in the pipe is known or can be calculated, a butterfly valve may be chosen that has reasonably linear characteristics. However, sufficient information on the piping frequently is not known. In these cases, the adjustable port valve is useful, as it can be field adjusted to provide the proper pressure drop with approximately linear characteristics.

Traveling Mill

Work fixtures on this boring mill are permanently mounted; spindles travel to them

A FLOOR-TYPE horizontal boring mill, with two traveling spindle columns and four work stations, saves 50 to 60 hours of setup time a month in machining turret lathe bed castings at Warney & Swasey Co., Cleveland.

The installation, built by Lucas Machine Division of New Britain Machine Co., Cleveland, lets the operator take the spindle to the work, rather than the work to the spindle.

Permanent Fixtures — Fixtures for each of the four saddle-type turret lathe beds being machined are permanently mounted on floor-level, cast iron tables. The mill's twin columns move at right angles to the table on two 40-ft rails.

To move the columns longitudinally, the operator clutches a revolving nut onto a stationary screw mounted between the rails. Two pushbutton pendants control all motions of the columns. A third column can be added to the machine if production schedules require.

LATHE BED CASTINGS
. . . *permanently mounted in work fixtures*

Boring Bits — Sectional tool boards are mounted on racks beside each fixture. Each section contains the necessary rough and finish carbide boring bits to complete the various diameters and faces which comprise one bore.

Boring bits are of the quick-lock, microadjustable type, preground and set. Beneath each bit is a tag indicating its tool number and operation number. Blue tags are used for finish cutters to further aid quick identification.

Big machine volume and speed in this compact new

PRINTMASTER 810

Sturdy, compact, smartly styled, the new medium-priced Printmaster 810 has *everything*—easy, low-cost operation, high speed and *big machine* production capacity.

It prints and develops in one continuous operation at speeds up to 40 feet per minute . . . easily handles roll or cut stock as wide as 42 inches. Easy-to-reach controls command quick response throughout the machine's entire operation. Developing and printing sections are automatically synchronized for simplest operation at any speed.

Complete diffusion of vapors through exclusive "jet-nozzle feed" insures uniform, dry, fully developed prints. Spacious receiving trays automatically stack prints in sequence. Electrically welded one-piece assembly stands 61" high, 61" wide, 42" deep (including feedboard).

See and try the Printmaster 810 yourself. Call your nearest Ozalid distributor for a demonstration. His number's in the phone book, or write Ozalid, Dept. P-4, Johnson City, N. Y., for descriptive brochure.

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LAUNDRY FOR AIR...

Stainless from the
HOUSE OF STAINLESS
Thrives on Diet of Dust and Water in this Wet-Type Dust Collector

THE NEED—In developing the Roto-Clone Exhauster and Dust Separator, American Air Filter needed a material for the impeller blade assembly that would withstand the constant wear of abrasive dust and the corrosive action of the continuous water spray. Moreover, the material had to be workable for the intricate fabrication required.

THE ANSWER—Here was another job for stainless steel. But *which* stainless would give them all the properties they needed? For the answer, American Air Filter drew on CSS know-how. The stainless recommended has met every requirement for protection against wear and corrosion, and in addition, has provided the extra strength for vital parts to assure long service life.

Photos, courtesy American Air Filter Company, Inc., Louisville, Kentucky

Perhaps you are already using stainless steel in your product. Or, you may be considering its advantages for your production.

In either case, it is most important to make sure that the stainless you use is the *right* stainless for your purpose.

The House of Stainless will gladly help you select the proper grade and type. This service is backed up by comprehensive warehouse stocks and direct mill shipments through our mill placement department.

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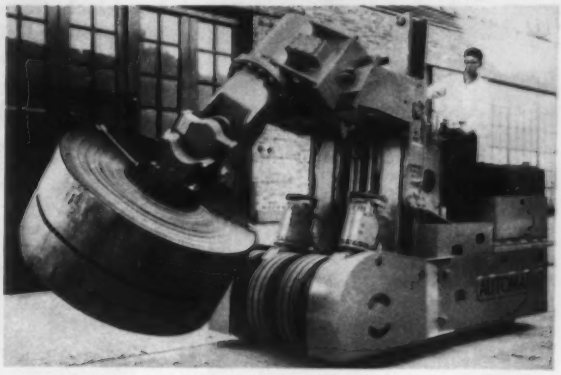
Ram Truck Attachment Rotates 60,000-Lb Steel Coils

Flexibility is added to coil storage methods by this attachment for automatic HR series electric trucks.

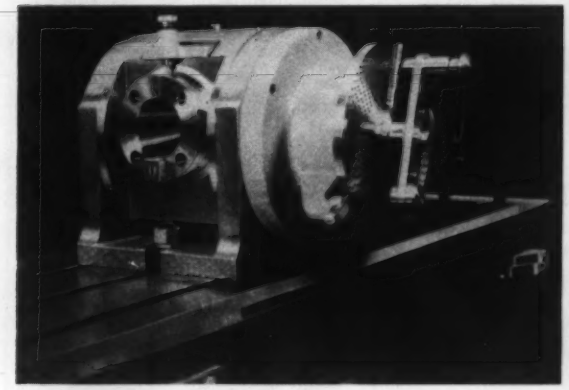
It picks up steel coils in either a vertical or horizontal position and rotates them to the opposite position without distorting the sheet or damaging the coil ends.

It eliminates the need for a separate coil up-ending unit in rolling mills and increases the usefulness of the heavy ram truck.

The attachment consists of a 90-degree rotator offset about 45 degrees vertically. A clamp and ram unit holds the coil securely during rotation to prevent it from telescoping. *Write*: Automatic Transportation Co., 149 W. 87th St., Chicago 20, Ill. *Phone*: Radcliffe 3-7000



Dividing Heads Are Built for Gear Cutting, Cam Milling



The 10, 12 and 14-in. dividing heads are accurately built for high precision work.

The dividing head spindle is mounted on antifriction bearings carried in a block having 360-degree peripheral clamping. The block is mounted in a housing to give 145-degree angular positioning of the spindle in the vertical plane.

A crank with a retractable pin handle, a sector for spacing and a reversible index plate comprise the indexing arrangement.

The crank's rotation is translated through a worm to a worm wheel keyed to the spindle.

For direct indexing, a bracket on top of the dividing head engages holes in the spindle nose. *Write*: Cincinnati Milling Machine Co., Cincinnati 9, O. *Phone*: Redwood 2121

Compact Arc Welder Uses Selenium Rectifiers

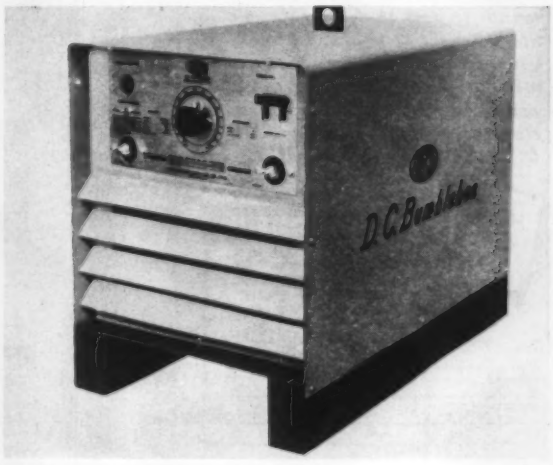
The direct-current Bumblebee has a single range of adjustment. Its low design permits stacking for parallel operations.

The machine is waterproofed for outdoor operation. A patented transformer produces instantaneous voltage recovery and control to give an easily handled arc.

Low operating temperatures are assured by forced draft ventilation. The fan is powered by a heavy duty, permanently lubricated, ball bearing motor.

The welder comes in 200, 300, and 400-amp models.

Another machine gives both alternating and direct current. It has a rheostat with micrometer current control within each range of the three-position switch. It is available in 200, 300 and 400-amp models, with or without power factor correction. *Write*: Air Reduction Sales Co., division of Air Reduction Co. Inc., 60 E. 42nd St., New York 17, N. Y. *Phone*: Murray Hill 2-6700



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installed on AIR-LOC pads without cement, bolts or lag screws. Press has been banging out production for one year without "walking."

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You just sit machines on AIR-LOC and the installation is complete. Installation and "waiting time" (for cement to dry) are cut in half. Costs for installation are the lowest known in industry today.

NOTE: *The AIR-LOC method sounds so easy that some people don't believe it works. To make your own savings on machine installation, ask us for prices to cover one lathe, planer, press, etc. Put one machine on AIR-LOC and judge for yourself.*

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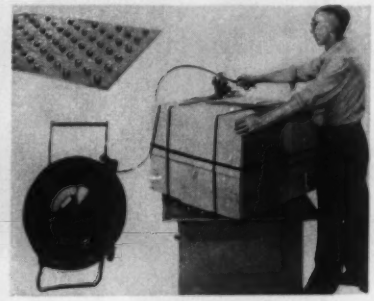
NEW PRODUCTS and equipment

Strapping Table

Strapping heavy containers is easier with this 36-in. square table top which contains sixty-one 1-in. ball casters. They extend ¾-in. above the table surface and are staggered on 3-in. centers.



The unit can be mounted on a permanent or portable base or in conveyor lines. A metal strap guide can be used to facilitate strap feeding. *Write*: Signode Steel Strapping Co., 2600 N. Western Ave., Chicago 47, Ill. *Phone*: Armitage 6-8500

Convection Furnaces

Temperite furnaces have a uniform temperature in all parts of the work chamber.

A high speed fan and a special alloy baffle, which directs the flow of air, assure positive forced circulation.

Heat is transferred rapidly and uniformly from the heating elements (on the sides of the work chamber) to the work.

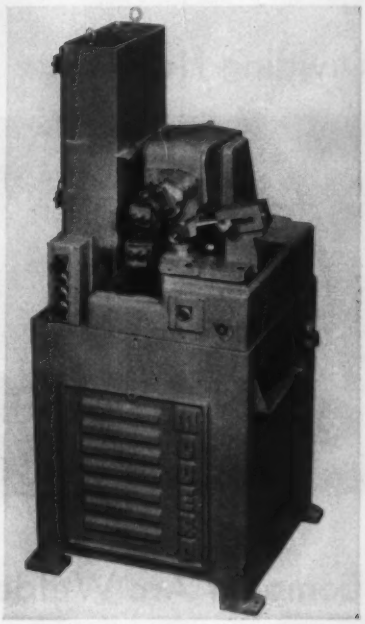
Radiation loss is reduced by preformed layers of graded insulation.

Heating elements are coiled, nickel-chromium wire held in ceramic refractories. *Write*: Hevi-Duty Electric Co., Milwaukee 1, Wis. *Phone*: West 3-2756

Gear Deburring

Model BME-14 Duplex deburrs and chamfers both sides of gears or splines at the same time.

It handles spur, helical and straight-sided gears, as well as involute splines, at rates up to five teeth a second.



Depth of chamfer is infinitely variable; adjustment is made in the tool holders. Tooling can be changed in 15 minutes. *Write*: Modern Industrial Engineering Co., 14230 Birwood Ave., Detroit 38, Mich. *Phone*: Webster 3-7280

Heat-Resistant Brick

Emeri-Brick withstands heat and thermal shock, even the dropping of cupola bottoms.

It is 2.22 x 3.55 x 7.75-in. and can be placed to suit the application.

The brick is usually positioned on end (for example, in ladle

rests) for maximum protection against heat and thermal shock.

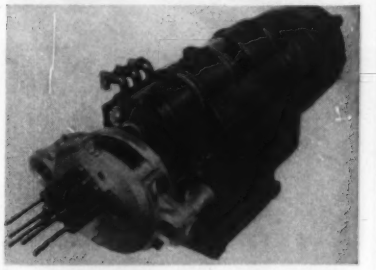
It is placed on edge in front of cupolas, in cooling and storage areas. In less critical heat areas, where temperatures range from 800 to 1200° F, it is placed flat.

After grouting, curing takes 24 to 36 hours. *Write*: Walter Maguire Co. Inc., 60 E. 42nd St., New York, N. Y. *Phone*: Murray Hill 7-9086

Automatic Drill Unit

Capacity of Model DU-2 ranges from wire sizes to ½-in. of steel.

A sensitive relay controls the cycle and the drill depth. A hydraulic system controls the rate of spindle feed and prevents overtravel at the bottom of the spindle stroke.



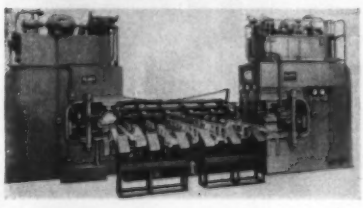
Drill depths can be set to less than 0.005-in. within the 3-in. maximum stroke. Air pressure feeds the spindle forward and returns it to its starting position. *Write*: Ettco Tool Co. Inc., 594 Johnson Ave., Brooklyn 37, N. Y. *Phone*: Hyacinth 7-4400

Tube-Reducing Press

One tube is reduced on both ends every 12 seconds by this custom-built, automated machine.

It removes tubing from a loaded magazine, positions the piece, carries it into a three-stage work station, then removes the finished tube and drops it into a tote box.

Tubes from 4½ to 13½-ft are



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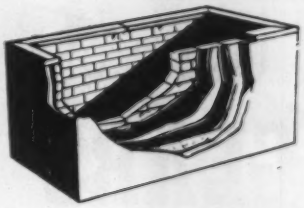
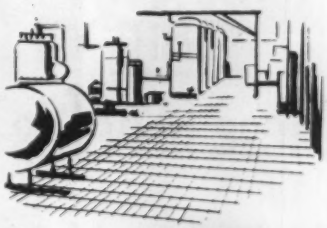
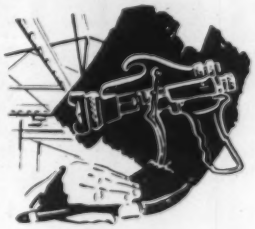


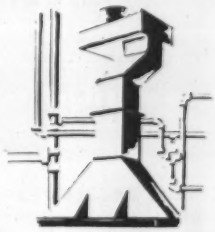
with ATLAS TANK LININGS for steel or concrete tanks. A complete corrosion-proof covering system from primer to protective brick sheathing.



with ATLAS CORROSION PROOF CEMENTS for the most severe conditions. Protection against acids, alkalies, salts, solvents and other corrosives.



with ATLAS PROTECTIVE COATINGS for almost every purpose. A complete line to assure the proper protective coating for the job.



with ATLAS RIGID PLASTIC STRUCTURES for tanks, fume exhaust duct work and complete pipe systems. Fabricated of highest quality corrosion proof plastics.

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Tear out this ad and check the block where corrosion protection is most needed in your plant. You will receive a complete bulletin giving all technical information.

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handled automatically through the press without any adjustment for handling the different sizes. *Write*: Elmes Engineering Division, American Steel Foundries, 1150-X Tennessee Ave., Cincinnati 29, O. *Phone*: Redwood 1-9210

Sectional Belt Conveyors

Pre-engineered units with capacities up to 1500 tons an hour use standard Link-Belt components, including the Series 50 belt idlers.

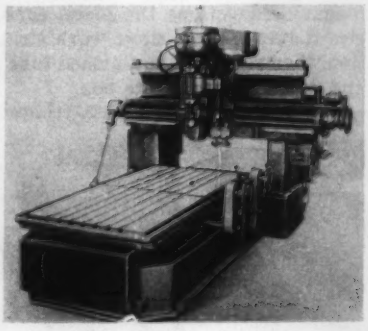
The conveyors are built in 18, 24, 30 and 36-in. belt widths, with 24 and 42-in.-deep trusses. Drives range up to 40 hp.

Conveyors are built in the company's plant nearest the job site, and components are shop assembled for easy installation. *Write*: Department PR, Link-Belt Co., 307 N. Michigan Ave., Chicago 1, Ill. *Phone*: Randolph 6-7790

Profile Miller

The Morey 50MA is equipped for hand profiling of ferrous and nonferrous metals. Also available are power feeds and tracing systems.

The spindle is driven by a 40-



hp motor. There are 18 speeds (from 44 to 4800 rpm).

Tables range from 48 x 48 in. up to 144 in. in increments of 2 ft. *Write*: Morey Machinery Co. Inc., 383 Lafayette St., New York 3, N. Y. *Phone*: Algonquin 4-6560

Mist Lubricator

MistOmatic spray control automatically applies a controlled, premeasured quantity of mist lubrication on open gears, chains, cams, rollers, eccentrics, slides and ways, circular saws and similar surfaces.

The injector spray control valves also have been used to spray premeasured amounts of lubricants, paint, glue and similar materials on production lines. *Write*: Industrial Division, Lincoln Engineering Co., 5702-33 Natural Bridge Ave., St. Louis 20, Mo. *Phone*: Evergreen 3-5900

Power Conveyor Curves

Clogging on curved conveyor lines is eliminated by chain-driven, power-roller conveyor curves.

The units can be driven from a ½-hp motor conveyor head shaft. The chain sprocket drive improves the flow of material. Speed of package movement can be up to 90 fpm.

A clear plastic chain guard encloses moving parts. *Write*: Harry J. Ferguson Co., Jenkintown, Pa.

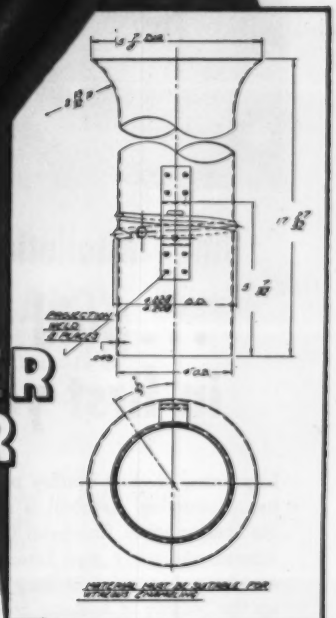
Milling Machine

The Mill-All faces: Structural steel beams and columns, other structural steel sections and fabrications, steel and iron castings, forgings and weldments. A tilting head model chamfers plates and bars.

The machine does plate edging and can be adapted to mill alumi-

Michigan
Electric Resistance WELDED STEEL TUBING
Always makes possible better products at lower Cost

CONDENSER TUBE for WASHER-DRYER



ROUND
¼ to 4 O.D. 7 to 22 gauge

SQUARE	Gauge	RECTANGULAR
¼ to ½	16 thru 22	½ minimum
½ to 1	11 thru 22	side to 5
1 to 2	11 thru 20	maximum side
2 to 3	11 thru 18	

Carbon 1010 to 1025

Michigan Tubing has uniform strength, weight, ductility, I.D. and O.D., wall thickness, machinability, and weldability. It can be flanged, expanded, tapered, swaged, beaded, upset, flattened, forged, spun closed, fluted, and rolled. Available in a wide range of sizes, shapes and wall thicknesses, prefabricated by Michigan or formed and machined in your own plant.

A significant component of a new combination washer-dryer now on the market is this condenser tube fabricated by Michigan.

In the manufacture of this important tubular part, which helped make possible a major forward step in the development of an appliance for better living, Michigan engineers were required to solve a difficult production problem. The utmost design skill and fabrication accuracy were essential.

Refer to the drawing and note the expansion required for this part and the spiral bead—operations commonly and efficiently performed with Michigan's modern fabricating equipment. The bracket is projection welded to the tube in a single high production operation—another typical example why Michigan engineers and production workers cannot be excelled in the quantity manufacture of intricate tubular products at low cost.

Always consult Michigan first on any special tubular job requiring the greatest accuracy of product and economy of manufacture.

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How IH uses automatic finishing equipment

Binks installation at International Harvester

"...paid for itself 1½ times in first year of operation."

Improving product quality by improving production methods is typical of the International Harvester Company. About one year ago International sought an economical way to speed up the coating of radiator cores for its well known tractors and trucks...and to reduce the number of rejects.

K. J. Merner, Paint Engineer at International's Melrose Park, Ill., Works, called in Binks engineers to help him and his associates solve the problem. The result is a custom-designed Binks Flo-Coat machine which, says Mr. Merner, "paid for itself 1½ times in the first year of operation."

This unusual economy is obtained by:

(1) *The finishing of radiator cores at unprecedented speeds.*

(2) *Complete, uniform coating of even hard-to-get-at areas.*

(3) *Reduction of material waste to the minimum.*

(4) *Almost total elimination of rejected radiator cores.*

For every industry

Almost any mass-produced product manufactured today can be finished or coated...better, faster and more economically...with Binks automatic finishing equipment.

FREE ENGINEERING HELP

Binks engineers work closely with manufacturers in the design and installation of automatic equipment that meets special requirements. Binks' long experience in this field is available to you without obligation. Just contact your nearest Binks Branch Office, or write directly to the address below:

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num and other nonferrous metals.

Metal removal rates range from 40 to 80 cu in. a minute (with cuts up to ¾-in.). Models provide horizontal cutter travel from 72 to 144 in. and vertical cutter travel from 60 to 84 in.

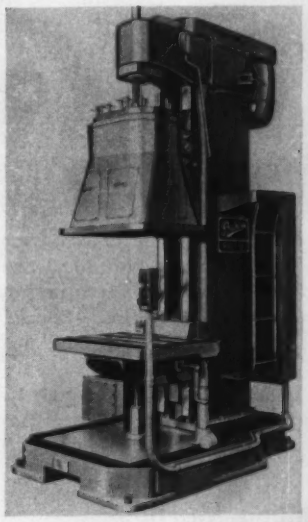
Indexable-blade, carbide face mills give high cutting capacity. They can be indexed to eight cutting positions before they need regrinding.

The cutter spindle is driven by a 40-hp motor. Also available: A 75-hp motor. *Write*: Kling Bros. Engineering Works, 1320 N. Kostner Ave., Chicago 51, Ill. *Phone*: Capital 7-4200

Drilling Machines

The smallest of three models in a line of adjustable-spindle machines has 12-in. wide ways, a 16-in. stroke and 7½-hp.

Another model has 18-in. wide ways, an 18-in. stroke and 15 hp. The largest model has 24-in. ways, a 24-in. stroke and 20 hp.



Each model is built with a variety of head sizes and spindle-drive arrangements. A separate motor drives the hydraulic power unit which provides an infinite feed range and various cycling sequences. *Write*: Buhr Machine Tool Co., Ann Arbor, Mich. *Phone*: Normandy 2-5646

NEW literature

Write directly to the company for a copy

Broached Screw

A screw with a symmetrical socket broached through its entire length is described in bulletin 736. Socket Screw Division, Bristol Co., Waterbury 20, Conn.

Cutting Tools

Rotary files and cutters, countersinks, carbide end mills and special tools are listed in bulletin 601, 12 pages. M. A. Ford Mfg. Co. Inc., 732 W. River St., Davenport, Iowa.

Brass Diecastings

Design data in this 4-page folder outline the most economical uses of brass diecastings. Department C, Customer Service Division, Titan Metal Mfg. Co., Bellefonte, Pa.

Corrosion-Proof Cements

Bulletin 5-2 contains technical data on furan, phenolic, sulphur, polyester and silica-based cements in its 12 pages. Atlas Mineral Products Co., Mertztown, Pa.

Welded Tubing

Bulletin TB-362, 4 pages, tells how carbon steel mechanical tubing solves engineering problems, simplifies production and reduces costs. Tubular Products Division, Babcock & Wilcox Co., Beaver Falls, Pa.

Seam Welder

An air-operated, single-phase welder that does a wide range of work is described in bulletin 316-7, 6 pages. Dept. L-6, Sciaky Bros. Inc., 4915 W. 67th St., Chicago, Ill.

Gage Catalog

A 48-page catalog describes ring gages, plug gages and master setting discs and includes information on wear allowances, tolerances and gaging practices. Dearborn Gage Co., 22038 Beech St., Dearborn, Mich.

Electroplating

Bulletin C-108, 4 pages, describes cleaners used to prepare surfaces for electroplating. Carbon pile tank rheostats are presented in bulletin CPR-200, 4 pages. Hanson-Van Winkle-Munning Co., Church St., Matawan, N. J.

Gages

Thread, ring and plug gages are listed in catalog 875G, 28 pages. Metro Division, Besly-Welles Corp., Beloit, Wis.

2500 POUNDS OF PUMP RUNNER

A TYPICAL DURALOY HIGH ALLOY CASTING

This casting is 18-8, destined for use under quite corrosive conditions. It's typical of the work done in our modern foundry for both manufacturers who need high alloy castings for their equipment and for plant operators who need castings to meet a corrosion problem, a high temperature problem or a combination of both, with or without abrasion as a contributing factor.

We here at Duraloy now offer several distinctly different kinds of castings, all in the corrosion-resisting, heat-resisting or abrasion-resisting class and each kind offering certain distinct advantages:

static sand castings

centrifugal castings

shell molded castings

Shell molding offers great economy in the casting of small pieces on a large mass production basis.

Bring your high alloy casting problem to Duraloy both for recommendations as to the best alloying combination and for foundry services in casting and finishing the piece. Our recommendations and service are backed up by more than thirty years high alloy casting experience.

THE DURALOY COMPANY

OFFICE AND PLANT Scottdale, Pa.

EASTERN OFFICE 12 East 41st Street New York 17 N Y

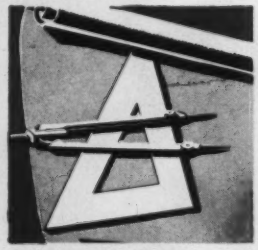
DETROIT OFFICE 23906 Woodward Avenue, Pleasant Ridge, Mich

CHICAGO OFFICE 332 South Michigan Avenue

6 reasons for checking your Commercial Heat Treater First

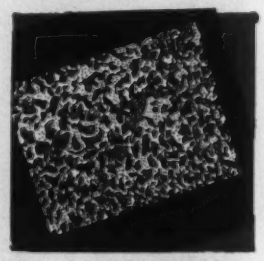
HE PROVIDES . . .

1



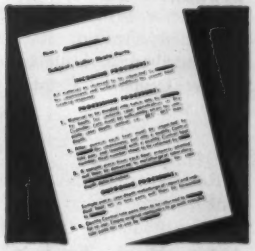
Guidance in Steel Selection and Design

2



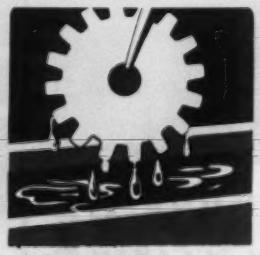
Metallurgical Understanding of Metal Properties

3



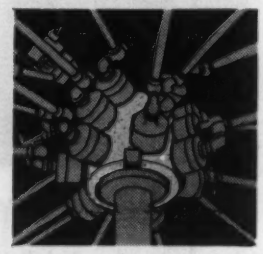
Assistance in Proper Preparation of Parts for Heat Treating

4



Knowledge through Experience of the Right Heat Treat for the Job

5



Extensive array of Equipment and Facilities

6

Final laboratory and non-destructive Testing

Whenever your production requirements for a new product or the redesign or improvement of an old one mean the installation or expansion of heat treating activities, it will pay you to check with your Commercial heat treater before tackling the job yourself.

The 6 basic reasons for this are shown above. Remember the Commercial Heat Treater has the skill, the experience, the equipment;—all under one roof ready to serve you.

Ace Metal Treating Corp.
Elizabeth, New Jersey
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Main Offices: 830 South Fifth Street, Milwaukee
Anderson Steel Treating Co.
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This advertisement sponsored by these Companies which are members of the Metal Treating Institute.

Market Outlook

STEEL SCRAP PRICES forecast a continued strong demand for steel.

In the fourth consecutive week of uptrend they jumped so sharply in the week ended Mar. 28 that they boosted STEEL's price composite on steelmaking grades of scrap $3.67 over the preceding week. This jump pushed the composite to a new record of $53.50 a gross ton. Previous record was $53.33 set in January.

BELLWETHER—Scrap makes up about half the raw materials that go into a ton of new steel. So, the steel industry's fortunes shape those of the scrap industry, too. Scrap prices move up and down in anticipation of trends in steel demand and production.

Even though there are some other influences in the current rise in scrap prices, the jump is so sharp you can come to only one conclusion: Steel demand and production will be strong the rest of the year.

UPWARD FORCES—The "other" influences in the current rise of scrap prices include a reduced flow of scrap, rising prices of pig iron and increased railroad freight rates. The scrap flow shrank with the drop in automobile production. Scrap is a by-product of auto output—the fewer the cars, the lower the scrap output. Pig iron, the other big volume ingredient in new steel, is rising $1.50 a gross ton. Since the ratio of pig iron to scrap can be varied, the price of pig iron also influences the price of scrap. Boosting pig iron prices are increased costs of raw materials and rail transportation.

COMPOSITES RISE—STEEL's price composites on pig iron moved up to $58.93 a gross ton on basic, $59.42 on No. 2 foundry and $60.55 on malleable. They had been $58.49 on basic, $58.99 on No. 2 foundry and $59.77 on malleable.

STEEL's price composite on finished steel holds at $128.02 a net ton.

In the Seattle area, interest in export scrap has increased, and foreign buyers evidently are convinced that further price recession is unlikely. Several cargoes were reportedly sold to Japan.

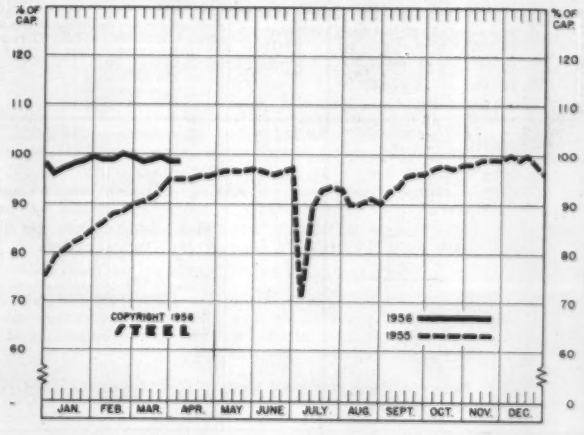
STEADY—The automobile industry, the only major steel consumer that reduced its pressure of demand for steel this year, is unlikely to ease up any further in the near future. Passenger auto makers' schedules for April, May and June exceed the first quarter by 2.1 per cent.

PROTECTION—Auto producers are reported to be putting steel into inventory. They are protecting themselves against steel price increases, a possible strike of steelworkers and laying in steel for what they hope will be a big sales spurt, come the 1957 models.

BOOKED UP—Some forms of steel look to be in tight supply for a long time to come. Promises on structural steel deliveries extend 12 months and longer in many cases. On a New York institutional project requiring 1300 tons of structurals, no fabricator who bid on them quoted deliveries in less than 12 months.

In trying to supply demand, producers continued to turn out steel for ingots and castings at 98.5 per cent of capacity. Producers are hampered by necessity to repair furnaces, whose lives are shortened by the fast pace of production.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of Capacity Engaged)

	Week Ended Apr. 1	Change	Same Week 1955	Same Week 1954
Pittsburgh	101.5	— 1.0*	97	75
Chicago	93.5	— 7.5*	95.5	79
Mid-Atlantic	98.0	— 1.0	94	61
Youngstown	94.0	+10.0	96	70
Wheeling	98.0	+ 2.0	89.5	67.5
Cleveland	96.0	— 2.0	102	57.5
Buffalo	105.0	0	100	67.5
Birmingham	93.0	— 3.0	87.5	75.5
New England	86.0	+ 4	70	65
Cincinnati	93.0	0	88	67
St. Louis	100.0	0	95	62
Detroit	102.0	+ 2.0	90	89
Western	103.0	0	98	76
National Rate	98.5	0	95	69

INGOT PRODUCTION‡

	Week Ended Apr. 1	Week Ago	Month Ago	Year Ago
INDEX (1947-1949=100)	149.4	152.5	153.1	141.8
NET TONS (In thousands)	2,400	2,449	2,459	2,278

*Change from preceding week's revised rate. †Estimated. ‡Amer. Iron & Steel Institute. Weekly capacity (net tons): 2,461,893 in 1956; 2,413,278 in 1955; 2,384,549 in 1954.

Metalworking Outlook—p. 47 Technical Outlook—p. 95

Price Indexes and Composites

FINISHED STEEL PRICE INDEX (Bureau of Labor Statistics)

	Mar. 27 1956	Mar. 20 1956	Month Ago	Mar. Average
(1947-1949=100)	157.1	157.1	157.1	157.1

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Mar. 27

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them write to STEEL.

Rails, Standard, No. 1	$4.800	Sheets, Electrical	$10.175
Rails, Light, 40 lb	6.217	Strip, C.R., Carbon	8.243
Tie Plates	5.625	Strip, C.R., Stainless, 403 (lb)	0.444
Axles, Railway	8.350	Strip, H.R., Carbon	5.606
Wheels, Freight Car, 33 in. (per wheel)	52.50	Pipe, Black, Buttweld (100 ft)	16.997
Plates, Carbon	5.200	Pipe, Galv., Buttweld (100 ft)	21.137
Structural Shapes	4.867	Pipe, Line (100 ft)	167.250
Bars, Tool Steel, Carbon (lb)	0.460	Casing, Oil Well, Carbon (100 ft)	165.120
Bars, Tool Steel Alloy, Oil Hardening Die (lb)	0.560	Casing, Oil Well, Alloy (100 ft)	244.670
Bars, Tool Steel, H. R., Alloy, High Speed W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.60 (lb)	1.185	Tubes, Boiler (100 ft)	39.470
Bars, Tool Steel, H.R., Alloy, High Speed W-18, Cr 4, V 1 (lb)	1.680	Tubing, Mechanical, Carbon	21.133
Bars, H.R., Alloy	9.425	Tubing, Mechanical Stainless, 304 (100 ft)	178.897
Bars, H.R., Stainless, 303 (lb)	0.450	Tin plate, Hot-dipped, 1.25 lb	8.933
Bars, H.R., Carbon	5.500	Tin Plate, Electrolytic, 0.25 lb	7.633
Bars, Reinforcing	5.313	Black Plate, Canmaking Quality	6.733
Bars, C.F., Carbon	8.800	Wire, Drawn, Carbon	8.575
Bars, C.F., Alloy	12.275	Wire, Drawn, Stainless 430 (lb)	0.590
Bars, C.F., Stainless, 302 (lb)	0.475	Bale ties (bundle)	6.517
Sheets, H.R., Carbon	5.345	Nails, Wire, 8d Common	8.603
Sheets, C.R., Carbon	6.214	Wire, Barbed (80-rod spool)	7.847
Sheets, Galvanized	7.770	Woven Wire Fence (20-rod roll)	18.625
Sheets, C.R., Stainless 302 (lb)	0.588		

STEEL's FINISHED STEEL PRICE INDEX*

	Mar. 28 1956	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Index (1935-39 av.=100)	209.10	209.10	209.10	194.53	171.92
Index in cents per lb	5.665	5.665	5.665	5.270	4.657

STEEL's ARITHMETICAL PRICE COMPOSITES

Finished Steel, NT*	$128.02	$128.02	$128.02	$118.45	$106.32
No. 2 Fdry Pig Iron, GT	59.42	58.99	58.99	56.54	52.54
Basic Pig Iron, GT	58.93	58.49	58.49	56.04	52.16
Malleable Pig Iron, GT	60.55	59.70	59.55	57.27	53.27
Steelmaking Scrap, GT	53.50	49.83	48.17	37.41	44.00

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL

	Mar. 28 1956	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	4.65	4.65	4.65	4.30	3.70
Bars, H.R., Chicago	4.65	4.65	4.65	4.30	3.70
Bars, H.R., deld. Philadelphia	4.93	4.93	4.90	4.55	4.18
Bars, C.F., Pittsburgh	6.25*	6.25*	6.25*	5.40	4.55
Shapes, Std., Pittsburgh	4.60	4.60	4.60	4.25	3.65
Shapes, Std., Chicago	4.60	4.60	4.60	4.25	3.65
Shapes, deld., Philadelphia	5.00	5.00	4.88	4.53	3.90
Plates, Pittsburgh	4.50	4.50	4.50	4.225	3.70
Plates, Chicago	4.50	4.50	4.50	4.225	3.70
Plates, Coatesville, Pa.	4.80	4.80	4.80	4.225	4.15
Plates, Sparrows Point, Md.	4.50	4.50	4.50	4.225	3.70
Plates, Claymont, Del.	4.80	4.80	4.80	4.225	4.15
Sheets, H.R., Pittsburgh	4.325	4.325	4.325	4.05	3.60-3.75
Sheets, H.R., Chicago	4.325	4.325	4.325	4.05	3.60
Sheets, C.R., Pittsburgh	5.325	5.325	5.325	4.95	4.35
Sheets, C.R., Chicago	5.325	5.325	5.325	4.95	4.35
Sheets, C.R., Detroit	5.325-5.425	5.325-5.425	5.325-5.425	5.10	4.55
Sheets, Galv., Pittsburgh	5.85	5.85	5.85	5.45	4.80
Strip, H.R., Pittsburgh	4.325	4.325	4.325	4.05	3.75-4.00
Strip, H.R., Chicago	4.325	4.325	4.325	4.05	3.50
Strip, C.R., Pittsburgh	6.25	6.25	6.25	5.75	4.65-5.35
Strip, C.R., Chicago	6.25-6.35	6.25-6.35	6.25-6.35	5.85	4.90
Strip, C.R., Detroit	6.35	6.35	6.35	5.90	4.35-5.60
Wire, Basic, Pittsburgh	6.60	6.60	6.60	5.75	4.85-5.10
Nails, Wire, Pittsburgh	7.60	7.60	7.60	6.85	5.90-6.20
Tin plate (1.50 lb), box, Pitts.	$9.45	$9.45	$9.45	$9.05	$8.70

*Including 0.35c for special quality.

SEMIFINISHED STEEL

Billets, Forging, Pitts. (NT)	$84.50	$84.50	$84.50	$78.00	$66.00
Wire rods, 7/32-5/8" Pitts.	5.375	5.375	5.375	4.675	4.10-4.30

PIG IRON, Gross Ton

Bessemer, Pitts.	$61.00	$59.50	$59.50	$57.00	$53.00
Basic Valley	58.50	58.50	58.50	56.00	52.00
Basic, deld. Phila.	63.76	62.16	62.16	59.66	56.39
No. 2 Fdry, Pitts.	60.50	59.00	59.00	56.50	52.50
No. 2 Fdry, Chicago	60.50	59.00	59.00	56.50	52.50
No. 2 Fdry, Valley	59.00	59.00	59.00	56.50	52.50
No. 2 Fdry, deld. Phila.	64.26	62.66	62.66	55.16	56.89
No. 2 Fdry, Birm.	55.00	55.00	55.00	52.88	48.88
No. 2 Fdry (Birm.) deld. Cin.	62.70	62.70	62.70	60.58	55.58
Malleable, Valley	59.00	59.00	59.00	56.50	52.50
Malleable, Chicago	60.50	59.00	59.00	56.50	52.50
Ferromanganese, Duquesne	205.00†	205.00†	205.00†	190.00†	188.00*

†74-76% Mn, net ton. *75-82% Mn, gross ton, Etna, Pa.

SCRAP, Gross Ton (Including broker's commission)

No. 1 Heavy Melt, Pitts.	$53.50	$49.00	$47.50	$38.50	$45.00
No. 1 Heavy Melt, E. Pa.	53.50	51.00	50.50	37.75	43.50
No. 1 Heavy Melt, Chicago	53.50	49.50	47.00	36.00	43.50
No. 1 Heavy Melt, Valley	57.50	55.50	52.50	37.50	45.00
No. 1 Heavy Melt, Cleve.	54.50	52.50	49.50	35.00	44.00
No. 1 Heavy Melt, Buffalo	50.50	47.50	46.50	32.50	44.00
Rails, Rerolling, Chicago	72.50	66.50	66.50	50.50	52.50
No. 1 Cast, Chicago	48.50	48.50	46.50	41.50	49.00

COKE, Net Ton

Beehive, Furn, Connlsvl.	$14.125	$14.125	$14.125	$13.75	$14.75
Beehive, Fdry, Connlsvl.	16.50	16.50	16.50	16.75	17.50
Oven, Fdry, Chicago	27.00	27.00	27.00	24.50	21.00

Daily Nonferrous Price Record

	Price Mar. 28	Last Change	Previous Price	Feb. Avg.	Jan. Avg.	Mar. 1955 Avg.
Copper	46.00-50.50	Mar. 27, 1956	46.00-51.00	48.076	46.700	33.222
Lead	15.80	Jan. 13, 1956	16.30	15.800	15.960	14.800
Zinc	13.50	Jan. 6, 1956	13.00	13.500	13.440	11.500
Tin	100.50	Mar. 27, 1956	99.375	100.908	105.067	91.176
Nickel	64.50	Nov. 24, 1954	60.00	64.500	64.500	64.500
Aluminum	24.40-25.90	Mar. 27, 1956	24.00	24.400	24.400	23.200
Magnesium	32.50	Aug. 16, 1955	28.50	32.500	32.500	27.556

Quotations in cents per pound based on: COPPER, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary ingots, 99 + %, deld.; MAGNESIUM, 99.8% Freeport, Tex.

What You Can Use the Markets Section for:

- **A source of price information.** Current prices are reported each week. Price changes are shown in italics. Price trends are shown in tables of indexes and comparisons.
- **A directory of producing points.** Want to know who makes something, or where it is made? The steel price tables alphabetically list the cities of production and indicate the producing company. If you are a buyer, you may want to make a map showing comparative distances of sources of supply and to help you compute freight costs. If you are a seller of supplies you can make a map to spot your sales possibilities.
- **A source of price data for making your own comparisons.** Maybe you want to keep a continuous record of price spread between various forms of steel. You can get your base price information from STEEL's price tables.
- **A source of information on market trends.** Newsy items tell you about the supply-demand situation of materials, including iron and steel, nonferrous metals and scrap. Other articles analyze special situations of interest and importance to you.
- **Reports on iron and steel production, and materials and product shipments.**

20% reduction in Inventory Space

90% reduction in Operating Personnel

. . . with ECONOMY elevating transfer cars

Heavy jet turbine engine subassemblies are handled with push button ease on Economy elevating transfer cars.

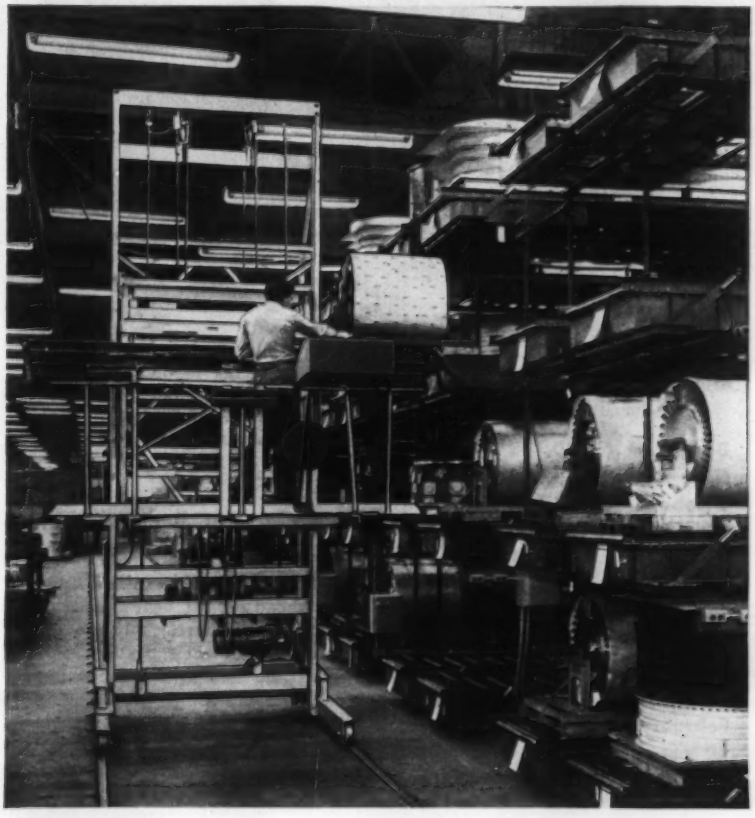
These transfer cars take the palletized assemblies from inspection area and move them on tracks to the appropriate tier. The operator raises and transfers the pallet to the selected stock tier. Another Economy transfer car on the other side of the storage tier removes pallets to the final assembly line. This system guarantees inventory turnover on a first-in first-out basis.

The system operates with smooth effortless automation and with no danger of damage to the fabricated assemblies. This Economy transfer car system with the resulting reduction of operating personnel and the complete utilization of inventory space is a unique factor in cost saving operations.

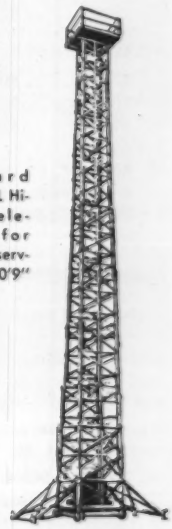
For over 50 years Economy has been engineering and building special lifting and Hi-Reach service machines. Our engineers have constantly improved the mechanical construction to obtain maximum strength and safety. ***—What is your problem?—***

Write E. W. McDonnell **ECONOMY ENGINEERING CO., 4517 W. Lake St., Chicago 24, Ill.**

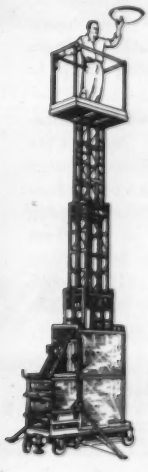
New York Office—342 Madison Ave., New York 17, N. Y.



Standard Model PUL Hi-Reach Telescoper for overhead service. Lifts 10'9" to 15'.



Custom Built Hi-Reach Telescoper. Heights up to 100 ft.



Standard Model LB Hi-Reach Telescoper for overhead service. Heights 20 ft. to 35 ft.

Nonferrous Metals

U. S. primary aluminum producers raise prices on all grades to help create expansion capital. Another hike could come after labor negotiations in May and June

Nonferrous Metal Prices, Pages 130 & 131

ALUMINUM PRICES jumped on Mar. 26 for the first time since Aug. 8, 1955. Kaiser Aluminum & Chemical Corp. led the parade by announcing a 1.5-cent-a-pound increase (primary ingot to 25.90 cents per pound) on all grades.

Reynolds Metals Co. followed suit on Mar. 27. Some of Reynolds' reasons for raising prices: 1. The aluminum industry currently is operating around the clock. It must expand. 2. Cost of building new primary facilities runs about $1500 per ton of capacity. This is about five times greater than the cost per ton of new steel capacity. 3. Government incentives have been withdrawn. And adds Richard S. Reynolds Jr., president: "Since 1939, weekly earnings of employees have risen more than 200 per cent."

Alcoa, Too—Aluminum Co. of America made its move on Mar. 29, following the pattern set by Kaiser. Aluminium Ltd. is still studying the situation.

Outlook — Everyone will raise aluminum prices. It is just a matter of time. Look for Aluminium to follow quickly so that the stage will be set for another round of price hikes as soon as labor negotiations are concluded in May and June.

Texas Smelter Will Close

The tin market continues to dip gradually (about 98.5 cents per pound). Some tin men point out that this may be a temporary situation caused in part by the falling copper prices on the LME. Others contend that tin is getting back to its normal price.

President Eisenhower will definitely recommend that the Texas City tin smelter be closed. Even though it is an election year, Texas politicians may have a difficult time keeping the smelter in operation as Congress will have to enact a new law rather than pass a resolution. It is estimated that this project is costing the government $10 million a year.

Copper: LME Price Nose Dives

Kennecott Copper Corp. officials are in Chile attempting to come to an agreement which will allow Kennecott to keep its Chilean and domestic production at the 46-cents-a-pound level. With the plummeting London Metal Exchange prices for the red metal (down to about 49 cents a pound), Kennecott is in a good position to drive a hard bargain.

The battle over whether the copper industry should go to world prices continues. One observer told STEEL: "We can't. How would mill people be able to judge price when they have to buy at least 60 days in advance?"

Some industry spokesmen feel that if the primary producers would go to a world price, copper might dip to 40 cents a pound. Look for March production statistics to bring a sobering influence to the market, too. Indications are that primary copper production reached a record.

Titanium Comes of Age?

The significant fact in Titanium Metals Corp. of America's expansion announcement is that its sponge capacity will be raised from 3600 to 6000 tons without government aid in the form of contractual guarantees. It is a vote of confidence by National Lead Co. and Allegheny Ludlum Steel Corp. (joint owners) for titanium's future. Look for other primary producers to announce expansion plans as orders continue to stack up.

Aluminum Sets Daily Record

(U. S. Production in Tons)

	Primary	Daily Rate
1956		
February	132,762	4,578
January	140,394	4,529
1955		
December	140,748	4,540
November	133,689	4,456
October	134,656	4,344
September	130,606	4,354
August	133,551	4,308
July	132,669	4,283
June	127,633	4,254
May	131,128	4,359
April	126,394	4,213
March	130,272	4,202
February	116,236	4,151

Source: Aluminum Association

Magnesium Shows Gains

Magnesium boosters are growing more optimistic. Preliminary estimates indicate that primary production is close to industry capacity. There are growing indications that the current 75,000-ton capacity may be upped 10 per cent by adding more power to the lines before the year ends. Reasons for optimism: 1. Civilian and military applications are growing. 2. Last year about 25 per cent of all magnesium production went to the aluminum industry. And aluminum continues to expand. 3. It takes a pound of magnesium to produce a pound of titanium by the Kroll process.

Nickel Problems Continue

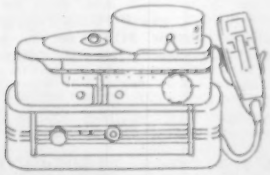
The Office of Defense Mobilization released 18 million lb of nickel from scheduled stockpile delivery on Mar. 21. This means that the hungry military machine will be satisfied. Civilian users will get no more nickel. ODM indulged in some double talk when it stated that the normal amount (500,000 lb) of Nicaro nickel oxide would be available. It is well known that for the past two or three months over 2 million lb of Nicaro oxide have been placed in users' hands each month.

It is growing close to the time when John R. Townsend (selected by ODM to survey the nickel industry) will submit his report. Rumors say that he will recommend that the government reduce stockpiling goals and support a secondary source of supply.

Lead and Zinc Demand Firm

"They'll hold their own," reports one producer. "Both metals are running ahead of last year's sales totals for the first quarter but are behind fourth quarter sales peaks." Special high grade zinc sales are off, but industry men point to rising auto sales as the solution to this problem. Outlook: Regardless of automakers' production, lead and zinc will have near record years.

TALK, LOOK AND LISTEN WITH Newport Steel



Essential elements in the nation's communication systems are the Newport Steel products used in manufacturing equipment for telegraph and telephone, radio and television, printing, publishing and daily mail. Many other industries also rely upon Newport's precision operations to supply quality materials that go to serve government, armed forces, industry and home. Strategically located in the heart of America's greatest industrial development, this 70-year-old organization has the modern facilities and experienced personnel to deliver every order to exact specifications and make Newport Steel the most logical source for your requirements.

ECONOMICAL WATERAIL-TRUCK DELIVERY

Newport Steel is ideally situated on the Mississippi-Ohio River system and the great Cincinnati rail-truck hub. New barge facilities, 7 major railroads, and 143 motor carriers enable Newport to give economical, dependable delivery to the entire area of the Middle West and South.

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Cold-Rolled Sheets
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Hot-Rolled Pickled Steel in Coil
Hot-Rolled Sheets
Hot-Rolled Pickled Sheets
Galvanized Sheets
Galvannealed Sheets
Colorbond Sheets
Electrical Sheets
Alloy Sheets and Plates
Electric Weld Line Pipe
Roofing and Siding
Eave Trough and Conductor Pipe
Culverts

Newport Steel CORPORATION

NEWPORT, KENTUCKY

YOUR CONFIDENCE IS JUSTIFIED WHERE THIS FLAG FLIES

A SUBSIDIARY OF MERRITT-CHAPMAN & SCOTT CORPORATION

Nonferrous Metals

Cents per pound, carlots, except as otherwise noted

PRIMARY METALS AND ALLOYS

Aluminum: 99 + %, ingots, 24.40-25.90; pigs, 22.50-24.00, 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 12% Si, 26.20-27.70; No. 43, 5% Si, 26.00-27.50; No. 142, 4% Cu, 1.5% Mg, 2% Ni, 28.20-29.70; No. 195, 4.5% Cu, 0.8% Si, 27.60-29.10; No. 214, 3.8% Mg, 27.80-29.30; No. 356, 7% Si, 0.3% Mg, 26.20-27.70.

Antimony: R.M.M. brand, 99.5%, 33.00; Lone Star brand, 33.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 27.00-28.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97%, lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $74.75 per lb of contained Be, f.o.b. Reading, Pa., Elmore, O.

Beryllium Copper: 3.75-4.25% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. Reading, Pa., or Elmore, O.

Bismuth: $2.25 per lb ton lots.

Cadmium: Sticks and bars, $1.70 per lb deld.

Cobalt: 97-99%, $2.60 per lb for 550-lb keg; $2.62 per lb for 100-lb case; $2.67 per lb under 100 lb.

Columbium: Powder, $119.20 per lb, nom.

Copper: Electrolytic, 46.00 deld. Conn. Valley; 46.00 deld. Midwest; custom smelters, 50.50 deld.; Lake, 46.00 deld.; Fire refined, 45.75 deld.

Germanium: First reduction, $201.85-$220 per lb; intrinsic grade, $220-$242.67 per lb, depending on quantity.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $100-$110 nom. per troy oz.

Lead: Common, 15.80; chemical, 15.90; corroding, 15.90, St. Louis. New York basis, add 0.20.

Lithium: 99+, cups or ingots, $11.50; rod $13.50; shot or wire, $14.50, f.o.b. Minneapolis. 100 lb lc's.

Magnesium: Pig, 32.50 f.o.b. Velasco, Tex.; ingot, 33.25 f.o.b. Velasco, Tex.

Magnesium Alloys: AZ91B (diecasting), 31.00 deld.; AZ63A, AZ92A, AZ91C (sand castings), 36.00 f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $258-$260 per 76-lb flask.

Molybdenum: Powder, 99% hydrogen reduced, $3.20 per lb; pressed ingot, $4.06 per lb; sintered ingot, $5.53 per lb.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 64.50; 10-lb pigs, unpacked, 67.65; "XX" nickel shot, 69.00; "F" nickel shot or ingots for addtition to cast iron, 64.50; prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 0.92.

Osmium: $80-$100 per troy oz, nom.

Palladium: $23-$24 per troy oz.

Platinum: $97-$111 per troy oz from refineries.

Radium: $16-$21.50 per mg radium content, depending on quantity.

Rhodium: $118-$125 per troy oz.

Ruthenium: $45-$55 per troy oz.

Selenium: 99.5%, $13.50-$15.50 per lb.

Silver: Open market, 91.25 per troy oz.

Sodium: 16.50, c.l.; 17.00 l.c.l.

Tantalum: Sheet, rod, $68.70 per lb; powder, $56.63 per lb.

Tellurium: $1.50-$1.75 per lb.

Thallium: $12.50 per lb.

Tin: Straits, N. Y., spot, 100.50; prompt, 100.375.

Titanium: Sponge, 99.3+%, grade A-1 ductile (0.3% Fe max), $3.45; grade A-2 (0.5% Fe max), $3.15 per pound.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $4.50 per lb, nom., f.o.b. shipping point; less than 1000 lb add 15.00; 99 + % hydrogen reduced, $5.00. Treated ingot, $6.70.

Zinc: Prime Western, 13.50; brass special, 13.75; intermediate, 14.00, East St. Louis, freight allowed over 0.50 per pound. High grade, 14.85; special high grade, 15.25 deld. Diecasting alloy ingot No. 3, 18.00; No. 2, 19.00; No. 5, 18.50, deld.

Zirconium: Ingots, commercial grade, $14.40 per lb; low-hafnium reactor grade, $23.07. Sponge, commercial grade, $7.50-$10.00 per lb, depending on quantity; reactor grade, $14.00-$22.00 per lb, depending on quantity. Powder, electronics grade, $15 per lb; flash grade, $11.50.

(Note: Chromium, manganese and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 31.75-33.75; No. 12 foundry alloy (No. 2 grade), 30.00-31.00; 5% silicon alloy, 0.60 Cu max, 32.00-32.25; 13 alloy, 0.60 Cu max, 32.00-32.25; 195 alloy, 32.00-32.25; 108 alloy, 30.50. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 30.50-31.00; grade 2, 29.00-30.00; grade 3, 29.00-29.50; grade 4, 28.00-28.50.

Brass Ingot: Red brass, No. 115, 44.00; tin bronze, No. 225, 58.00; No. 245, 50.75; high-leaded tin bronze, No. 305, 47.75; No. 1 yellow, No. 405, 34.75; manganese bronze, No. 421, 39.25.

Magnesium Alloy Ingot: AZ63A, 34.00; AZ91B, 34.00; AZ91C, 34.00; AZ92A, 34.00.

NONFERROUS MILL PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb, f.o.b. Temple, Pa.; nominal 1.9% Be alloy) Strip, $1.92; rod, bar, wire, $1.89.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 30,000-lb lots, 51.35-54.35; l.c.l., 51.98-54.98. Weatherproof, 30,000-lb lots, 48.28-50.53; l.c.l., 49.03-51.28. Magnetic wire deld., 15,000 lb or more, 58.68-61.84; l.c.l., 59.43-62.59.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets, full rolls, 140 sq ft or more, $21.50 per cwt; pipe, full coils, $21.50 per cwt; traps and bends, list prices plus 30%.

TITANINUM

(Prices per lb, 10,000 lb and over, f.o.b. mill) Sheets, $13.10-$13.60; sheared mill plate, $10.50-$12.00; strip, $13.10-$13.60; wire, $9.50-$11.50; forging billets, $7.90-$8.15; hot-rolled and forged bars, $7.90-$8.15.

ZINC

(Prices per lb, c.l., f.o.b. mill) Sheets, 23.00-24.00; ribbon zinc in coils, 21.50; plates, 20.00-22.25.

ZIRCONIUM

Plate, $22; H.R. strip, $19; C.R. strip, $29; forged or H.R. bars, $17; wire, 0.015 in., 1.00c per linear foot.

	NICKEL, "A" Nickel	MONEL, Monel	INCONEL, Inconel
Sheets, C.R.	102	83	99
Strip, C.R.	102	92	125
Plate, H.R.	97	87	95
Rod, Shapes, H.R.	87	74	93
Seamless Tubes	122	110	153

ALUMINUM

Screw Machine Stock: 30,000 lb base.

Diam. (in.) or across flats	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
Drawn				
0.125	67.9	66.4	...	...
0.156-0.172	57.5	55.9	...	...
0.188	57.5	55.9	...	71.7
0.219-0.234	54.5	52.9	...	...
0.250-0.281	54.5	52.9	...	68.4
0.313	54.5	52.9	...	65.2
Cold-finished				
0.375-0.547	53.4	51.4	63.7	61.3
0.563-0.688	53.4	51.4	60.6	57.5
0.750-1.000	52.1	50.1	55.4	54.2
1.063	52.1	50.1	...	52.3
1.125-1.500	50.1	48.2	53.6	52.3
Rolled				
1.563	48.8	46.9	...	...
1.625-2.000	48.2	46.2	...	50.5
2.125-2.500	47.0	45.0	...	...
2.563-3.375	45.6	43.6	...	...

ALUMINUM

Sheet and Circle: 1100 and 3003 mill finish (30,000 lb base; freight allowed)

Thickness Range Inches	Flat Sheet	Flat Sheet Circles*	Coiled Sheet	Coiled Sheet Circles†
0.249-0.136	37.5	42.3	...	...
0.135-0.096	38.0	43.2	...	...
0.095-0.077	38.7	44.2	36.1	41.3
0.076-0.061	39.3	45.1	36.3	41.5
0.060-0.048	39.9	45.6	36.7	42.0
0.047-0.038	40.4	46.5	37.2	42.4
0.037-0.030	40.8	47.0	37.6	43.1
0.029-0.024	41.4	47.5	37.9	43.6
0.023-0.019	42.2	49.0	38.8	44.5
0.018-0.017	43.0	...	39.4	45.4
0.016-0.015	43.9	...	40.2	46.6
0.014	44.9	...	41.2	47.9
0.013-0.012	46.1	...	41.9	48.9
0.011	47.1	...	43.1	50.5
0.010-0.0095	48.4	...	44.3	52.2
0.009-0.0085	49.7	...	45.8	54.3
0.008-0.0075	51.3	...	47.0	56.1
0.007	52.8	...	48.5	58.4
0.006	54.4	...	49.9	63.4

*48 in. max diam. †26 in. max diam.

ALUMINUM

Plates and Circles: Thickness 0.250-3 in., 24-60 in. width or diam, 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	36.5	40.8
5050-F	37.6	41.9
3004-F	38.6	43.8
5052-F	39.9	45.2
6061-T6	41.1	46.0
2024-T4*	43.6	49.9
7075-T6*	51.4	58.5

*24-48 in. widths or diam, 72-180 lengths.

ALUMINUM

Forging Stock: Round, Class 1, 39.10-50.10 in specific lengths 36-144 in., diameters 0.375-8 in. Rectangles and squares, Class 1, 43.00-56.20 in random lengths, 0.375-4 in. thick, width 0.750-10 in.

Pipe: ASA Schedule 40, alloy 6063-T6, 20-ft lengths, plain ends, 90,000-lb base, per 100 ft.

Nom. Pipe Size (in.)		Nom. Pipe Size (in.)	
¾	$16.85	2	$ 51.95
1	26.50	4	143.00
1¼	35.85	6	256.70
1½	42.90	8	386.30

MAGNESIUM

Sheet and Plate: AZ31A standard grade, .032 in., 99.00; .064 in., 78.00; .125 in., 63.50; .250-2.0 in., 61.00. AZ31A special grade, .032 in., 145.00; .064 in., 100.00; .125 in., 83.00; .250-2.0 in., 79.00. Tread plate, .125 in., 68.00; .250-3.0 in., 64.00. Tooling plate, .250-3.0 in., 65.00.

Extrusions	Com. Grade (FS)	Spec. Grade (AZ31B)
1 in. diam. rod	61.50	73.00
Shapes: 0.3 lb/ft	65.40-72.40	76.90-83.90
1.0 lb/ft	61.90-67.30	73.40-78.80
4.0 lb/ft	57.70-62.20	69.20-73.70
2 in. OD x ⅛ in. w. tubing	74.50	86.00

NONFERROUS SCRAP

DEALERS BUYING PRICES

(Cents per pound, New York, in ton lots)

Aluminum: 1100 clippings, 21.50; old sheets, 18.50; borings and turnings, 11.50-12.50; crankcases, 18.50; industrial castings, 18.00.

Copper and Brass: No. 1 heavy copper and wire, 41.50; No. 2 heavy copper and wire, 39.00; light copper, 36.00; No. 1 composition red brass, 31.00-31.50; No. 1 composition turnings, 30.00-30.50; yellow brass turnings,

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES f		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tube	Clean Heavy	Rod Ends	Clean Turnings
Copper	67.13–70.13b	64.36–67.36c	....	67.32–70.32	45.000	45.000	44.250
Yellow Brass	55.60–57.60	45.65–47.51d	56.14–58.14	58.51–60.51	33.250	33.000	30.750
Low Brass, 80%	60.15–62.55	60.09–62.49	60.69–63.09	62.96–65.36	33.750	37.500	37.000
Red Brass, 85%	61.79–64.34	61.73–64.28	62.33–64.88	64.60–67.15	39.500	39.250	38.750
Com. Bronze, 90%	63.98–66.68	63.92–66.62	64.52–67.22	66.54–69.24	41.250	41.000	40.500
Manganese Bronze	62.64–64.58	56.65–58.54	67.09–68.85	....	31.125	30.875	30.375
Muntz Metal	56.94–58.74	52.75–54.55	....	....	31.000	30.750	30.250
Naval Brass	58.90–60.70	53.21–55.01	65.96–67.76	62.06–63.86	30.750	30.500	30.000
Silicon Bronze	70.48–73.36	69.67–72.55	70.52–73.40	72.66–75.61e	43.625	43.375	42.625
Nickel Silver, 10%	69.20–71.15	71.53–73.48g	71.53–73.48	....	36.625	36.375	18.313
Phos. Bronze, A, 5%	85.37–88.22	85.87–88.72	85.87–88.72	87.05–89.90	45.500	45.250	44.250

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. 3% silicon. f. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb. Based on copper at 49 cents a pound. g. Leaded

19.50-20.50; new brass clippings, 28.00-28.50; light brass, 19.00-19.50; heavy yellow brass, 21.50-22.00; new brass rod ends, 26.50-27.00; auto radiators, unsweated, 24.00-24.50; cocks and faucets, 24.50-25.00; brass pipe, 25.00-25.50.

Lead: Heavy, 12.75-13.00; battery plates, 6.50-6.75; linotype and stereotype, 14.00-14.50; electrotype, 13.25-13.75; mixed babbitt, 15.50.
Magnesium: Clippings, 18.50-19.50; clean castings, 18.00-19.00; iron castings, not over 10% removable Fe, less full deduction for Fe, 16.00-17.00.

Monel: Clippings, 60.00-70.00; old sheets, 55.00-70.00; turnings, 50.00; rods, 59.50-70.00.
Nickel: Sheets and clips, 100.00-150.00; rolled anodes, 100.00-150.00; turnings, 85.00-125.00; rod ends, 100.00-150.00.

Zinc: Old zinc, 6.00-6.50; new die-cast scrap, 6.00; old die-cast scrap, 3.50.

REFINER'S BUYING PRICES

(Cents per pound, carlots, delivered refinery)
Aluminum: 1100 clippings, 23.00-23.25; 3003 clippings, 23.00; 6151 clippings, 22.75; 5052 clippings, 22.75; 2014 clippings, 22.00-22.75; 2017 clippings, 22.00-22.75; 2024 clippings, 22.00-22.50; mixed clippings, 22.00-22.50; old sheet, 20.50-21.00; old cast, 20.50-21.00; clean old cable (free of steel), 22.75-23.00; borings and turnings, 20.50-21.50.

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 68.00; light scrap, 63.00; turnings and borings, 48.00.
Copper and Brass: No. 1 heavy copper and wire, 43.50; No. 2 heavy copper and wire, 42.00; light copper, 39.75; refinery brass (60% copper) per dry copper content, 40.00.

INGOTMAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)

Copper and Brass: No. 1 heavy copper and wire, 43.50; No. 2 heavy copper and wire, 42.00; light copper 39.75; No. 1 composition borings, 34.00; No. 1 composition solids, 34.50; heavy yellow brass solids, 25.00; yellow brass turnings, 24.00; radiators, 26.50.

PLATING MATERIAL

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.70 per lb.

Copper: Flat-rolled, 66.79; oval, 65.92, 5000-10,000 lb; electrodeposited, 64.25, 2000-5000 lb lots; cast 63.54, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, $1.015; 100-499 lb, 99.50; 500-4999 lb, 95.50; 5000-29,999 lb, 93.50; 30,000 lb, 91.50. Carbonized, deduct 3 cents a lb. All prices eastern delivery, effective Jan. 1, 1955.

Tin: Bar or slab, less than 200 lb, $1.175; 200-499 lb, $1.160; 500-999 lb, $1.155; 1000 lb or more, $1.150.

Zinc: Balls, 21.00; flat tops, 21.00; flats, 22.75; ovals, 22.00, ton lots.

CHEMICALS

Cadmium Oxide: $2.15 per lb, in 100-lb drums.

Chromic Acid: Less than 10,000 lb, 28.50; over 10,000 lb, 27.50.

Copper Cyanide: 100 lb, 85.25; 200 lb, 84.50; 300 lb, 84.25; 400-900 lb, 83.50; 1000 lb, 81.50.

Copper Sulphate: 500-1900 lb, 17.90; 2000-5900 lb, 15.90; 6000 lb or more, 15.65.

Nickel Chloride: 100 lb, 46.50; 200 lb, 44.50; 300 lb, 43.50; 400-4900 lb, 41.50; 5000-9900 lb, 39.50; 10,000 lb and over, 38.50. All prices eastern delivery, effective Jan. 1, 1955.

Nickel Sulphate: 100 lb, 38.25; 200 lb, 36.25; 300 lb, 35.25; 400-4900 lb, 33.25; 5000-35,900 lb, 31.25; 36,000 lb, 30.25. All prices eastern delivery, effective Jan. 1, 1955.

Silver Cyanide: (Cents per ounce) 4-oz bottle, 86.875; 15-oz bottle, 85.625; 80-oz bottle, 83.125; 100-oz bottle, 83.125; f.o.b. St. Louis, New York and Los Angeles. Effective Sept. 30, 1955.

Sodium Cyanide: Egg, under 1000 lb, 19.80; 1000-19,900 lb, 18.80; 20,000 lb, and over, 17.80; granular, add 1-cent premium to above.

Sodium Stannate: Less than 100 lb, 70.90; 100-600 lb, 62.50; 700-1900 lb, 60.00; 2000-9900 lb, 58.30; 10,000 lb or more, 57.10.
Stannous Chloride (anhydrous): Less than 25 lb, $1.677; 25 lb, $1.327; 100 lb, $1.177; 400 lb, $1.153; 5200-19,600 lb, $1.031; 20,000 lb, 90.90.
Stannous Sulphate: Less than 50 lb, $1.304; 50 lb, $1.004; 100-1900 lb, 98.40; 2000 lb or more, 96.40.

Zinc Cyanide: Under 1000 lb, 54.30; 1000 lb and over, 52.30.

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CONCO BUILDING PRODUCTS, INC.—Brick, Tile, Stone

Steel Prices

Mill prices as reported to STEEL, cents per pound except as otherwise noted. *Changes shown in italics.* Code numbers following mill points indicate producing company. Key to producers, page 133; to footnotes, page 135.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)

Munhall, Pa. U5 ....$65.50

INGOTS, Alloy (NT)

Detroit R7 .....$69.00
Houston S5 .....74.00
Midland, Pa. C18 .....69.00
Munhall, Pa. U5 .....69.00

BILLETS, BLOOMS & SLABS Carbon, Rerolling (NT)

Aliquippa, Pa. J5 ....$68.50
Bessemer, Pa. U5 .....68.50
Bridgeport, Conn. N19 ..73.50
Buffalo R2 .....68.50
Clairton, Pa. U5 .....68.50
Ensley, Ala. T2 .....68.50
Fairfield, Ala. T2 .....68.50
Fontana, Calif. K1 .....78.00
Gary, Ind. U5 .....68.50
Johnstown, Pa. B2 .....68.50
Lackawanna, N.Y. B2 ..68.50
LoneStar, Tex. L6 ....74.50
Munhall, Pa. U5 .....68.50
Pittsburgh J5 .....68.50
S. Chicago, Ill. R2, U5 ..68.50
S. Duquesne, Pa. U5 ....68.50
Youngstown R2 .....68.50

Carbon, Forging (NT)

Aliquippa, Pa. J5 ....$84.50
Bessemer, Pa. U5 .....84.50
Bridgeport, Conn. N19 ..89.50
Buffalo R2 .....84.50
Canton, O. R2 .....86.50
Clairton, Pa. U5 .....84.50
Conshohocken, Pa. A3 ..89.50
Ensley, Ala. T2 .....84.50
Fairfield, Ala. T2 .....84.50
Fontana, Calif. K1 ....94.00
Gary, Ind. U5 .....84.50
Geneva, Utah C11 .....84.50
Houston S5 .....101.00
Johnstown, Pa. B2 .....84.50
Lackawanna, N.Y. B2 ..84.50
LosAngeles B3 .....94.00
Midland, Pa. C18 .....84.50
Munhall, Pa. U5 .....84.50
Pittsburgh J5 .....84.50
Seattle B3 .....98.00
S. Chicago R2, U5, W14 ..84.50
S. Duquesne, Pa. U5 ....84.50
S. SanFrancisco B3 ....94.00

Alloy, Forging (NT)

Bethlehem, Pa. B2 ....$96.00
Buffalo R2 .....96.00
Canton, O. R2, T7 ....96.00
Conshohocken, Pa. A3 ..103.00
Detroit R7 .....96.00
Fontana, Calif. K1 ....117.00
Gary, Ind. U5 .....96.00
Houston S5 .....105.00
Ind. Harbor, Ind. Y1 ....96.00
Johnstown, Pa. B2 ....96.00
Lackawanna, N.Y. B2 ..96.00
LosAngeles B3 .....116.00
Massillon, O. R2 .....96.00
Midland, Pa. C18 .....96.00
Munhall, Pa. U5 .....96.00
S. Chicago R2, U5, W14 ..96.00
S. Duquesne, Pa. U5 ....96.00
Struthers, O. Y1 .....96.00
Warren, O. C17 .....96.00

ROUNDS, SEAMLESS TUBE (NT)

Buffalo R2 .....$103.50
Canton, O. R2 .....103.50
Cleveland R2 .....103.50
Gary, Ind. U5 .....103.50
S. Chicago R2, W14 ..103.50
S. Duquesne, Pa. U5 ...103.50

SKELP

Aliquippa, Pa. J5 .....4.325
LoneStar, Tex. L6 .....4.625
Munhall, Pa. U5 .....4.225
SparrowsPoint, Md. B2..4.225
Warren, O. R2 .....4.225
Youngstown R2, U5 ...4.225

WIRE RODS

AlabamaCity, Ala. k.. ..5.375
Aliquippa, Pa. J5 .....5.375
Alton, Ill. L1 .....5.55
Buffalo W12 .....5.375
Cleveland A7 .....5.375
Donora, Pa. A7 .....5.375
Fairfield, Ala. T2 .....5.375
Houston S5 .....5.625
IndianaHarbor, Ind. Y1..5.375
Johnstown, Pa. B2 ....5.375
Joliet, Ill. A7 .....5.375
KansasCity, Mo. S5 ....5.625
Kokomo, Ind. C16 ....5.475
Los Angeles B3 .....6.175
Minnequa, Colo. C10 ...5.625
Monessen, Pa. P7 .....5.375
N. Tonawanda, N.Y. B11 5.375
Pittsburg, Calif. C11 ...6.025
Portsmouth, O. P12 ....5.375
Roebling, N.J. R5 ....5.475
S. Chicago, Ill. R2 .....5.375
SparrowsPoint, Md. B2..5.475
Sterling, Ill. (1) N15 ...5.375
Sterling, Ill. N15 .....5.475
Struthers, O. Y1 .....5.375
Worcester, Mass. A7 ...5.675

STRUCTURALS

Carbon Steel Std. Shapes

Ala. City, Ala. R2 .....4.60
Aliquippa, Pa. J5 .....4.60
Bessemer, Ala. T2 .....4.60
Bethlehem, Pa. B2 .....4.65
Birmingham C15 .....5.10
Clairton, Pa. U5 .....4.60
Fairfield, Ala. T2 .....4.60
Fontana, Calif. K1 .....5.30
Gary, Ind. U5 .....4.60
Geneva, Utah C11 .....4.60
Houston S5 .....4.70
Ind. Harbor, Ind. I-2 ....4.60
Johnstown, Pa. B2 .....4.65
KansasCity, Mo. S5 ....4.70
Lackawanna, N.Y. B2 ..4.65
LosAngeles B3 .....5.30
Minnequa, Colo. C10 ....4.90
Munhall, Pa. U5 .....4.60
Niles, Calif. P1 .....5.25
Phoenixville, Pa. P4 ....5.15
Portland, Oreg. O4 .....5.35
Seattle B3 .....5.35
S. Chicago U5, W14 ....4.60
S. SanFrancisco B3 ....5.25
Torrance, Calif. C11 ....5.30
Weirton, W. Va. W6 ....4.60

Wide Flange

Bethlehem, Pa. B2 .....4.65
Clairton, Pa. U5 .....4.60
Fontana, Calif. K1 .....5.45
Lackawanna, N.Y. B2 ..4.65
Munhall, Pa. U5 .....4.60
Phoenixville, Pa. P4 ....5.15
S. Chicago, Ill. U5 .....4.60

Alloy Std. Shapes

Clairton, Pa. U5 .....5.65
Fontana, Calif. K1 .....7.40
Gary, Ind. U5 .....5.65
Houston S5 .....5.75
Munhall, Pa. U5 .....5.65
S. Chicago, Ill. U5 .....5.65

H.S., L.A. Std. Shapes

Aliquippa, Pa. J5 .....6.75
Bessemer, Ala. T2 .....6.75
Bethlehem, Pa. B2 .....6.80
Clairton, Pa. U5 .....6.75
Fairfield, Ala. T2 .....6.75
Fontana, Calif. K1 .....7.45
Gary, Ind. U5 .....6.75
Geneva, Utah C11 .....6.75
Houston S5 .....6.85
Ind. Harbor, Ind. I-2, Y1.6.75
Johnstown, Pa. B2 .....6.80
KansasCity, Mo. S5 ....6.85
Lackawanna, N.Y. B2 ...6.80
LosAngeles B3 .....7.45
Munhall, Pa. U5 .....6.75
Seattle B3 .....7.50
S. Chicago, Ill U5, W14..6.75
S. SanFrancisco B3 ....7.40
Struthers, O. Y1 .....6.75

H.S., L.A. Wide Flange

Bethlehem, Pa. B2 .....6.80
Lackawanna, N.Y. B2 ...6.80
Munhall, Pa. U5 .....6.75
S. Chicago, Ill. U5 .....6.75

PILING

BEARING PILES

Bethlehem, Pa. B2 ....4.65
Lackawanna, N.Y. B2 ...4.65
Munhall, Pa. U5 .....4.60
S. Chicago, Ill. U5 .....4.60

STEEL SHEET PILING

Ind. Harbor, Ind. I-2 ....5.45
Lackawanna, N.Y. B2 ...5.45
Munhall, Pa. U5 .....5.45
S. Chicago, Ill. U5 .....5.45

PLATES

PLATES, Carbon Steel

Ala. City, Ala. R2 .....4.50
Aliquippa, Pa. J5 .....4.50
Ashland, Ky. (15) A10 ...4.50
Bessemer, Ala. T2 .....4.50
Bridgeport, Conn. N19 ..4.75
Buffalo R2 .....4.50
Clairton, Pa. U5 .....4.50
Claymont, Del. C22 .....4.80
Cleveland J5, R2 .....4.60
Coatesville, Pa. L7 .....4.80
Conshohocken, Pa. A3 ...4.50
Detroit M1 .....4.60
Ecorse, Mich. G5 .....4.60
Fairfield, Ala. T2 .....4.50
Fontana, Calif. (30) K1 ..5.20
Gary, Ind. U5 .....4.50
Geneva, Utah C11 .....4.50
GraniteCity, Ill. G4 .....4.70
Harrisburg, Pa. P4 ....5.10
Houston S5 .....4.60
Ind. Harbor, Ind. I-2, Y1.4.50
Johnstown, Pa. B2 .....4.50
Lackawanna, N.Y. B2 ..4.50
LoneStar, Tex. L6 .....4.85
Mansfield, O. E6 .....4.50
Minnequa, Colo. C10 ....5.35
Munhall, Pa. U5 .....4.50
Newport, Ky. N9 .....4.50
Pittsburgh J5 .....4.50
Riverdale, Ill. A1 .....4.725
Seattle B3 .....5.40
Sharon, Pa. S3 .....4.50
S. Chicago R2, U5, W14..4.50
SparrowsPoint, Md. B2..4.50
Steubenville, O. W10 ....4.50
Warren, O. R2 .....4.50
Weirton, W. Va. W6 ....4.50
Youngstown R2, U5, Y1.4.50

PLATES, Carbon Abras. Resist.

Claymont, Del. C22 ....5.65
Fontana, Calif. K1 .....6.35
Geneva, Utah C11 .....5.65
Johnstown, Pa. B2 .....5.65
SparrowsPoint, Md. B2 ..5.65

PLATES, Wrought Iron

Economy, Pa. B14 .....10.40

PLATES, High Strength Low-Alloy

Aliquippa, Pa. J5 .....6.725
Bessemer, Ala T2 .....6.725
Clairton, Pa. U5 .....6.725
Cleveland J5, R2 .....6.725
Claymont, Del. C22 .....6.725
Coatesville, Pa. L7 ....7.025
Conshohocken, Pa. A3 ..6.725
Ecorse, Mich. G5 .....6.825
Fairfield, Ala. T2 .....6.725
Fontana, Calif. (30) K1 .7.425
Gary, Ind. U5 .....6.725
Geneva, Utah C11 .....6.725
Houston S5 .....6.825
Ind. Harbor, Ind. I-2, Y1.6.725
Johnstown, Pa. B2 .....6.725
Munhall, Pa. U5 .....6.725
Pittsburgh J5 .....6.725
Seattle B3 .....7.625
Sharon, Pa. S3 .....6.725
S. Chicago, Ill. U5, W14..6.725
SparrowsPoint, Md. B2..6.725
Warren, O. R2 .....6.725
Youngstown U5, Y1 ....6.725

PLATES, Alloy

Bridgeport, Conn. N19 ...6.55
Claymont, Del. C22 ....6.30
Coatesville, Pa. L7 .....6.30
Fontana, Calif. K1 .....7.00
Gary, Ind. U5 .....6.30
Houston S5 .....6.40
Ind. Harbor, Ind. Y1 ....6.30
Johnstown, Pa. B2 .....6.30
Munhall, Pa. U5 .....6.30
Newport, Ky. N9 .....6.30
Seattle B3 .....7.20
Sharon, Pa. S3 .....6.30
S. Chicago, Ill. U5, W14..6.30
SparrowsPoint, Md. B2 ..6.30
Youngstown Y1 .....6.30

FLOOR PLATES

Cleveland J5 .....5.575
Conshohocken, Pa. A3 ..5.575
Harrisburg, Pa. P4 ...5.575
Ind. Harbor, Ind. I-2 ...5.575
Munhall, Pa. U5 .....5.575
S. Chicago, Ill. U5 .....5.575

PLATES, Ingot Iron

Ashland c.l. (15) A10...4.75
Ashland l.c.l. (15) A10..5.25
Cleveland c.l. R2 .....5.10
Warren, O. c.l. R2 ....5.10

BARS

(Commercial Quality)

BARS, Hot-Rolled Carbon

Ala. City, Ala. (9) R2 ....4.65
Aliquippa, Pa. (9) J5 ....4.65
Alton, Ill. L1 .....4.85
Atlanta A11 .....4.85
Bessemer, Ala. (9) T2 ....4.65
Birmingham C15 .....5.15
Bridgeport, Conn. N19 ...4.80
Buffalo (9) R2 .....4.65
Canton, O. (9) R2 .....4.75
Clairton, Pa. (9) U5 ....4.65
Cleveland (9) R2 .....4.65
Ecorse, Mich. (9) G5 ....4.75
Emeryville, Calif. J7 ....5.40
Fairfield, Ala. (9) T2 ....4.65
Fairless, Pa. (9) U5 ....4.80
Fontana, Calif. K1 .....5.35
Gary, Ind. (9) U5 .....4.65
Houston (9) S5 .....4.90
Ind. Harbor, Ind. (9) I-2..4.65
Ind. Harbor, Ind. Y1 ....4.65
Johnstown, Pa. (9) B2 ...4.65
Joliet, Ill. P22 .....5.15
KansasCity, Mo. (9) S5 ..4.90
Lackawanna (9) B2 ....4.65
LosAngeles (9) B3 ....5.35
Massillon, O. (9) R2 ....4.75
Midland, Pa. (9) C18 ...4.65
Milton, Pa. M18 .....4.80
Minnequa, Colo. C10 ....5.10
Niles, Calif. P1 .....5.35
N. T'wanda, N.Y. (9) B11 4.65
Pittsburg, Calif. (9) C11..5.35
Pittsburgh (9) J5 .....4.65
Portland, Oreg. O4 .....5.40
Seattle B3, N14 .....5.40
S. Chicago W14 .....4.65
S. Chicago, Ill. (9) R2, U5 4.65
S. Duquesne, Pa. (9) U5 ..4.65
S. SanFran., Calif. (9) B3 5.40
Sterling, Ill. (1) N15 ....4.65
Sterling, Ill. N15 .....4.75
Struthers, O. Y1 .....4.65
Torrance, Calif. (9) C11 ..5.35
Warren, O. (9) R2 .....4.65
Weirton, W. Va. (9) W6 ...4.65
Youngston (9) R2, U5 ...4.65

BARS, H.R. Leaded Alloy

Warren, O. C17 .....6.575

BARS, Hot-Rolled Alloy

Bethlehem, Pa. B2 .....5.575
Bridgeport, Conn. N19 ..5.725
Buffalo R2 .....5.575
Canton, O. R2, T7 .....5.575
Clairton, Pa. U5 .....5.575
Detroit R7 .....5.575
Ecorse, Mich. G5 .....5.675
Fairless, Pa. U5 .....5.725
Fontana, Calif. K1 .....6.625
Gary, Ind. U5 .....5.575
Houston S5 .....5.825
Ind. Harbor, Ind. I-2, Y1.5.575
Johnstown, Pa. B2 .....5.575
KansasCity, Mo. S5 ....5.825
Lackawanna, N.Y. B2..5.575
LosAngeles B3 .....6.625
Massillon, O. R2 .....5.575
Midland, Pa. C18 .....5.575
S. Chicago R2, U5, W14..5.575
S. Duquesne, Pa. U5 ....5.575
Struthers, O. Y1 .....5.575
Warren, O. C17 .....5.575
Youngstown U5 .....5.575

BARS & SMALL SHAPES, H.R. High-Strength Low-Alloy

Aliquippa, Pa. J5 .....6.80
Bessemer, Ala. T2 .....6.80
Bethlehem, Pa. B2 .....6.80
Clairton, Pa. U5 .....6.80
Cleveland R2 .....6.80
Ecorse, Mich. G5 .....6.90
Fairfield, Ala. T2 .....6.80
Fontana, Calif. K1 .....7.50
Gary, Ind. U5 .....6.80
Houston S5 .....7.05
Ind. Harb., Ind. I-2, Y1..6.80
Johnstown, Pa. B2 .....6.80
KansasCity, Mo. S5 ....7.05
Lackawanna, N.Y. B2 ...6.80
LosAngeles B3 .....7.50
Pittsburgh J5 .....6.80
Seattle B3 .....7.55
S. Chicago W14 .....6.80
S. Duquesne, Pa. U5 ....6.80
S. SanFrancisco B3 ....7.55
Struthers, O. Y1 .....6.80
Warren, O. R2 .....6.80
Youngstown U5 .....6.80

BAR SIZE ANGLES; H.R. Carbon

Bethlehem, Pa. (9) B2 ...4.80
Lackawanna (9) B2 ....4.65

BAR SIZE ANGLES; S. Shapes

Aliquippa, Pa. J5 .....4.65
Atlanta A11 .....4.85
Fontana, Calif. K1 .....5.35
Joliet, Ill. P22 .....5.10
Niles, Calif. P1 .....5.35
Pittsburgh J5 .....4.65
Portland, Oreg. O4 .....5.40
SanFrancisco S7 .....5.05

BAR SHAPES, Hot-Rolled Alloy

Clairton, Pa. U5 .....5.65
Gary, Ind. U5 .....5.65
Houston S5 .....5.90
KansasCity, Mo. S5 ....5.90
Youngstown U5 .....5.65

BARS, C.F. Leaded Alloy

Ambridge, Pa. W18 ....8.325
Camden, N.J. P13 .....8.35
Chicago W18 .....8.325
Cleveland C20 .....8.325
Monaca, Pa. S17 .....8.325
Newark, N.J. W18 .....8.50
SpringCity, Pa. K3 .....8.30
Warren, O. C17 .....8.575

BARS, Cold-Finished Carbon

Ambridge, Pa. W18 .....6.25
BeaverFalls, Pa. M12, R2 6.25
Buffalo B5 .....6.30
Camden, N.J. P13 .....6.70
Carnegie, Pa. C12 .....6.25
Chicago W18 .....6.25
Cleveland A7, C20 .....6.25
Detroit B5, P17 .....6.45
Detroit R7 .....6.25
Donora, Pa. A7 .....6.25
Elyria, O. W8 .....6.25
FranklinPark, Ill. N5 ....6.25
Gary, Ind. R2 .....6.25
GreenBay, Wis. F7 .....6.25
Hammond, Ind. L2, M13..6.25
Hartford, Conn. R2 .....6.75
Harvey, Ill. B5 .....6.25
LosAngeles (49) S30 .....7.70
LosAngeles R2 .....7.70
Mansfield, Mass. B5 .....6.80
Massillon, O. R2, R8 ....6.25
Midland, Pa. C18 .....6.25
Monaca, Pa. S17 .....6.25
Newark, N.J. W18 .....6.70
NewCastle, Pa. (17) B4..6.25
Pittsburgh J5 .....6.25
Plymouth, Mich. P5 .....6.50
Putnam, Conn. W18 .....6.80
Readville, Mass. C14 ...6.80
S. Chicago, Ill. W14 .....6.25
SpringCity, Pa. W3 .....6.70
Struthers, O. Y1 .....6.25
Waukegan, Ill. A7 .....6.25
Worcester, Mass. W19 ...6.70
Youngstown F3, Y1 ...6.25

BARS, Cold-Finished Carbon (Turned and Ground)

Cumberland, Md. (5) C19..5.16

BARS, Cold-Finished Alloy

Ambridge, Pa. W18 ....7.425
BeaverFalls, Pa. M12, R2 7.425
Bethlehem, Pa. B2 .....7.425
Buffalo B5 .....7.425
Camden, N.J. P13 .....7.60
Canton, O. T7 .....7.425
Carnegie, Pa. C12 .....7.425
Chicago W18 .....7.425
Cleveland A7, C20 .....7.425
Detroit R7 .....7.425
Detroit B5, P17 .....7.625
Donora, Pa. A7 .....7.425
Elyria, O. W8 .....7.425
Gary, Ind. R2 .....7.425
GreenBay, Wis. F7 .....7.425
Hammond, Ind. L2, M13..7.425
Hartford, Conn. R2 .....7.725
Harvey, Ill. B5 .....7.425
Lackawanna, N.Y. B2 ..7.425
LosAngeles S30 .....9.10
Mansfield, Mass. B5 ....7.725
Massillon, O. R2, R8 ....7.425
Midland, Pa. C18 .....7.425
Monaca, Pa. S17 .....7.425
Newark, N.J. W18 .....7.60
Plymouth, Mich. P5 .....7.625
S. Chicago W14 .....7.425
SpringCity, Pa. K3 .....7.60
Struthers, O. Y1 .....7.425
Warren, O. C17 .....7.425
Waukegan, Ill. A7 .....7.425
Worcester, Mass. A7 ....7.725
Youngstown F3, Y1 ...7.425

BARS, Reinforcing (To Fabricators)

Ala. City, Ala. R2 .....4.65
Atlanta A11 .....4.85
Birmingham C15 .....5.15
Buffalo R2 .....4.65
Cleveland R2 .....4.65
Ecorse, Mich. G5 .....4.75
Emeryville, Calif. J7 ....5.40
Fairfield, Ala. T2 .....4.65
Fairless, Pa. U5 .....4.80
Fontana, Calif. K1 .....5.35
Ft. Worth, Tex. (42) T4 ..5.10
Gary, Ind. U5 .....4.65
Houston S5 .....4.90

Ind.Harbor,Ind. I-2, Y1.4.65
Johnstown,Pa. B2 .....4.65
Joliet,Ill. P22 .....5.15
KansasCity,Mo. S5 ....4.90
Lackawanna,N.Y. B2 ..4.65
LosAngeles B3 .....5.35
Milton,Pa. M18 .....4.80
Minnequa,Colo. C10 ....5.10
Niles,Calif. P1 .....5.35
Pittsburg,Calif. C11 ....5.35
Pittsburgh J5 .....4.65
Portland,Oreg. O4 .....5.40
SandSprings,Okla. S5 ..5.15
Seattle B3, N14 .....5.40
S.Chicago R2 .....4.65
S.Duquesne,Pa. U5 ....4.65
S.SanFrancisco B3 ....5.40
SparrowsPoint,Md. B2 ..4.65
Sterling,Ill.(1) N15 ....4.65
Sterling,Ill. N15 .....4.75
Struthers,O. Y1 .....4.65
Torrance,Calif. C11 ....5.35
Youngstown R2, U5 ....4.65

BARS, Reinforcing
(Fabricated; to Consumers)

Johnstown,Pa. ¼-1" B2.6.15
KansasCity,Kans. S5 ..6.45
Lackawanna,N.Y. B2 ..6.17
Marion,O. P11 .....6.15
Pittsburgh U8 .....6.17
Seattle B3, N14 .....6.60
SparrowsPt. ¼-1" B2 ..6.15
Williamsport,Pa. S19 ...6.00

RAIL STEEL BARS

ChicagoHts.(3) C2, I-2..4.65
ChicagoHts.(4) C2, I-2..4.65
Ft.Worth,Tex.(26) T4 ..5.10
Franklin,Pa(3) F5 ....4.65
Franklin,Pa.(4) F5 ....4.65
JerseyShore,Pa.(4) J8 ..4.65
Marion,O.(3) P11 .....4.65
Moline,Ill.(3) R2 .....4.80
Tonawanda(3) B12 ....4.65
Tonawanda(4) B12 ....5.15
Williamsport,Pa.(3) S19.4.65

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 11.50
Economy,Pa.(D.R.)B14 14.30
Economy(Staybolt)B14 14.65
McK.Rks. (S.R.) L5 ...11.50
McK.Rks.(D.R.) L5 ...16.00
McK.Rks.(Staybolt) L5.17.00

SHEETS

SHEETS, Hot-Rolled Steel
(18 Gage and Heavier)

Ala.City,Ala. R2 ....4.325
Allenport,Pa. P7 .....4.325
Ashland,Ky.(8) A10 ..4.325
Cleveland J5, R2 ....4.325
Conshohocken,Pa. A3 ..4.375
Detroit(3) M1 .....4.425
Dravosburg,Pa. U5 ....4.325
Ecorse,Mich. G5 .....4.425
Fairfield,Ala. T2 ....4.325
Fairless,Pa. U5 .....4.375
Fontana,Calif. K1 ....5.125
Gary,Ind. U5 .....4.325
Geneva,Utah C11 ....4.425
GraniteCity,Ill. G4 ....4.525
Ind.Harbor,Ind. I-2,Y1 4.325
Lackawanna,N.Y. B2 ..4.325
Mansfield,O. E6 (37) ..4.325
Munhall,Pa. U5 .....4.325
Newport,Ky.(8) N9 ....4.325
Niles,O. M21 .....4.325
Pittsburg,Calif. C11 ...5.025
Pittsburgh J5 .....4.325
Portsmouth,O. P12 ....4.325
Riverdale,Ill. A1 .....4.55
Sharon,Pa. S3 .....4.325
S.Chicago,Ill. W14 ....4.325
SparrowsPoint,Md. B2.4.325
Steubenville,O. W10 ..4.325
Warren,O. R2 .....4.325
Weirton,W.Va. W6 ....4.325
Youngstown U5, Y1 ..4.325

SHEETS, H.R. (19 Ga. & Lighter)

Ala.City,Ala. R2 .....5.625
Niles,O. M21 .....5.325

SHEETS, H.R. Alloy

Ind.Harbor,Ind. Y1 ....7.20
Youngstown Y1 .....7.20

SHEETS, H.R. (14 Ga. & Heavier)
High-Strength Low-Alloy

Cleveland J5, R2 ....6.375
Conshohocken,Pa. A3 ...6.425
Dravosburg,Pa. U5 ...6.375
Ecorse,Mich. G5 .....6.475
Fairfield,Ala. T2 .....6.375
Fairless,Pa. U5 .....6.425
Fontana,Calif. K1 ....7.175
Gary,Ind. U5 .....6.375
Ind.Harbor,Ind. I-2, Y1.6.375
Lackawanna(35) B2 ...6.375
Munhall,Pa. U5 .....6.375
Pittsburgh J5 .....6.375
Sharon,Pa. S3 .....6.375
S.Chicago,Ill. U5 .....6.375
SparrowsPoint(36) B2.6.375
Warren,O. R2 .....6.375
Youngstown U5, Y1 ...6.375

SHEETS, Hot-Rolled Ingot Iron
(18 Gage and Heavier)

Ashland,Ky.(8) A10 ...4.575
Ind.Harbor,Ind. I-2 ...4.575

SHEETS, Cold-Rolled Steel
(Commercial Quality)

Allenport,Pa. P7 ....5.325
Cleveland J5, R2 ....5.325
Conshohocken,Pa. A3 ..5.375
Dravosburg,Pa. U5 ....5.325
Detroit M1 .....5.325
Ecorse,Mich. G5 .....5.425
Fairfield,Ala. T2 .....5.325
Fairless,Pa. U5 .....5.375
Follansbee,W.Va. F4 ..5.325
Fontana,Calif. K1 ....6.525
Gary,Ind. U5 .....5.325
GraniteCity,Ill. G4 ....5.525
Ind.Harbor,Ind. I-2, Y1.5.325
Lackawanna, N.Y. B2..5.325
Mansfield,O. E6 .....5.325
Middletown,O. A10 ....5.325
Newport,Ky. N9 .....5.325
Pittsburg,Calif. C11 ..6.275
Pittsburgh J5 .....5.325
Portsmouth,O. P12 ....5.325
SparrowsPoint,Md. B2..5.325
Steubenville,O. W10 ..5.325
Warren,O. R2 .....5.325
Weirton,W.Va. W6 ....5.325
Youngstown Y1 .....5.325

SHEETS, Cold-Rolled
High-Strength Low-Alloy

Cleveland J5, R2 ....7.875
Dravosburg,Pa. U5 ...7.875
Ecorse,Mich. G5 .....7.975
Fairless,Pa. U5 .....7.925
Fontana,Calif. K1 ....9.075
Gary,Ind. U5 .....7.875
IndianaHarbor,Ind. Y1.7.875
Lackawanna(37) B2 ..7.875
Pittsburgh J5 .....7.875
SparrowsPoint(38) B2..7.875
Warren,O. R2 .....7.875
Weirton,W.Va. W6 ....7.875
Youngstown Y1 .....7.875

SHEETS, Cold-Rolled Ingot Iron

Middletown,O. A10 ....5.825

SHEETS, Culvert (16 Gage)	Cu Alloy	Cu Fe
Ashland,Ky.	A10.6.90	...
Canton,O.	R2 ....6.10	6.55
Dravosburg	U5 ..6.10	...
Fairfield	T2 ....6.10	...
Gary,Ind.	U5 ....6.10	6.35
Ind.Harbor	I-2 ..6.10	6.35
Kokomo,Ind.	C16.6.20	...
MartinsFry.	W10.6.10	...
Newport,Ky.	N9..6.10	6.35
Pitts.,Calif.	C11..6.85	...
SparrowsPt.	B2..6.10	...

SHEETS, Culvert—Pure Iron

Ashland,Ky. A10 .....7.15
Gary,Ind. U5 .....6.35
MartinsFry,O. W10 ....6.35

SHEETS, Galvanized Steel
Hot-Dipped

Ala.City,Ala. R2 .....5.85‡
Ashland,Ky. A10 ....5.85†
Canton,O. R2 .....5.85‡
Dover,O. R1 .....5.85†
Dravosburg,Pa. U5 ....5.85†
Fairfield,Ala. T2 .....5.85†
Gary,Ind. U5 .....5.85*
GraniteCity,Ill. G4 ....6.05
Ind.Harbor,Ind. I-2 ...5.85†
Kokomo,Ind. C16 ....5.95‡
MartinsFerry,O. W10 ..5.85*
Middletown,O. A10 ....5.85†
Newport,Ky. N9 .....5.85‡
Pittsburg,Calif. C11 ..6.60*
Pittsburgh J5 .....5.85†
SparrowsPt.,Md. B2 ..5.85†
Warren,O. R2 .....5.85†
Weirton,W. Va. W6 ..5.85*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Well Casing

Fontana,Calif. K1 ....6.625

SHEETS, Galvanized
High-Strength Low-Alloy

Dravosburg,Pa. U5 ....8.60
SparrowsPoint(39) B2 ..8.60

SHEETS, Galvannealed Steel

Canton,O. R2 .....6.25
Dravosburg,Pa. U5 ....6.25
Kokomo,Ind. C16 .....6.60
Newport,Ky. N9 .....6.25

SHEETS, Galvanized Ingot Iron
(Hot-dipped Continuous)

Ashland,Ky. A10 .....6.10
Middletown,O. A10 ....6.10

SHEETS, Electrogalvanized

Cleveland(28) R2 .....6.70
Niles, O.(28) R2 .....6.70
Weirton,W.Va. W6 ....6.55

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1).8.80
Butler,Pa. A10 (type 2).8.60

SHEETS, Enameling Iron

Ashland,Ky. A10 .....5.90
Cleveland R2 .....5.90
Dravosburg,Pa. U5 ....5.90
Gary,Ind. U5 .....5.90
GraniteCity,Ill. G4 ....6.10
Ind.Harbor,Ind. I-2 ....5.90
Middletown,O. A10 ....5.90
Niles,O. M21 .....5.90
Youngstown Y1 .....5.90

BLUED STOCK, 29 Gage

Follansbee,W.Va. F4 ..7.75
Ind.Habor,Ind. I-2 ....7.75
Yorkville,O. W10 .....7.75

SHEETS, Long Terne Steel
(Commercial Quality)

BeechBottom,W.Va. W10 6.25
Gary,Ind. U5 .....6.25
Mansfield,O. E6 .....6.25
Middletown,O. A10 ....6.25
Niles,O. M21 .....6.25
Weirton,W.Va. W6 ....6.25

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....6.65

Key To Producers

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div. Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div., Buffalo-Eclipse Corp.
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div. Borg-Warner Corp.
C4 Carpenter Steel Co.
C7 Cleve.Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div. H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Products Dept. Wickwire Spencer Steel Division
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.

D2 Detroit Steel Corp.
D3 Detroit Tube & Steel Div., Sharon Steel Corp.
D4 Disston & Sons, Henry
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div. Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft.HowardSteel&Wire
F8 Ft. Wayne Metals Inc.

G2 Globe Iron Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins, E., Steel Tube
I-7 Indiana Steel&Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel&Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M13 Monarch Steel Div., Jones & Laughlin Steel Corp.
M14 McInnes Steel Co.
M16 Md.Fine&Special Wire
M17 Metal Forming Corp.
M18 Milton Steel Prod. Div., Merritt-Chapman&Scott
M21 Mallory-Sharon Titanium Corp.

N1 National-Standard Co.
N2 National Supply Co.
N3 National Tube Div., U.S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New Eng. High Carb. Wire
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N14 Northwest.SteelRoll.Mills
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.
N19 Northeastern Steel Corp.
O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills

P1 PacificStatesSteelCorp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co. Sub. of Barium Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke&Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Division, Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 RelianceDiv.,EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Senaca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service

T2 Tenn. Coal & Iron Div., U. S. Steel Corp.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Division, Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div. Am. Rad. & Stan. San.
T13 Tube Methods Inc.

U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless steels
U8 U. S. Steel Supply Div. U. S. Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Division, H. K. Porter, Inc.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W. Va. Steel&Mfg. Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.
W19 Worcester Pressed Steel

Y1 Youngstown Sheet&Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	4.325
Allenport,Pa. P7	4.325
Alton,Ill. L1	4.50
Ashland,Ky.(8) A10	4.325
Atlanta A11	4.525
Bessemer,Ala. T2	4.325
Birmingham C15	4.825
Bridgeport,Conn. N19	4.625
Buffalo(27) R2	4.325
Conshohocken,Pa. A3	4.375
Detroit M1	4.425
Ecorse,Mich. G5	4.425
Fairfield,Ala. T2	4.325
Fontana,Calif. K1	5.125
Gary,Ind. U5	4.325
Ind.Harbor,Ind. I-2,Y1	4.325
Johnstown,Pa.(25) B2	4.325
Lackaw'na,N.Y.(24) B2	4.325
LosAngeles(25) B3	5.075
Milton,Pa. M18	4.325
Minnequa,Colo. C10	5.425
Pittsburg,Calif. C11	5.075
Riverdale,Ill. A1	4.55
SanFrancisco S7	5.05
Seattle(25) B3	5.325
Seattle N14	5.40
Sharon,Pa. S3	4.325
S.Chicago,Ill. W14	4.325
S.SanFrancisco(25) B3	5.075
SparrowsPoint,Md. B2	4.325
Sterling(1) N15	4.325
Sterling,Ill. N15	4.425
Torrance,Calif. C11	5.075
Warren,O. R2	4.325
Weirton,W.Va. W6	4.325
Youngstown U5	4.325

STRIP, Hot-Rolled Alloy

Bridgeport,Conn. N19	7.50
Carnegie,Pa. S18	7.20
Fontana,Calif. K1	8.95
Gary Ind. U5	7.20
Ind.Harbor,Ind. Y1	7.20
LosAngeles B3	8.40
Newport,Ky. N9	7.20
Sharon,Pa. S3	7.20
S.Chicago W14	7.20
Youngstown U5, Y1	7.20

STRIP, Hot-Rolled High-Strength Low-Alloy

Bessemer,Ala. T2	6.425
Conshohocken,Pa. A3	6.425
Ecorse,Mich. G5	6.525
Fairfield,Ala. T2	6.425
Fontana,Calif. K1	7.575
Gary,Ind. U5	6.425
Houston S5	6.675
Ind.Harbor,Ind. I-2,Y1	6.425
KansasCity,Mo. S5	6.675
Lackawanna,N.Y. B2	6.425
LosAngeles(25) B3	7.175
Seattle(25) B3	7.425
Sharon,Pa. S3	6.425
S.SanFrancisco(25) B3	7.175
SparrowsPoint,Md. B2	6.425
Warren,O. R2	6.425
Weirton,W.Va. W6	6.425
Youngstown U5, Y1	6.425

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	4.575

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6	6.25
Baltimore T6	6.25
Boston T6	6.80
Buffalo S40	6.25
Cleveland A7, J5	6.25
Conshohocken,Pa. A3	6.30
Dearborn,Mich. D3	6.35
Detroit D2, M1, P20	6.35
Dover,O. G6	6.25
Ecorse,Mich. G5	6.35
Follansbee,W.Va. F4	6.25
Fontana,Calif. K1	8.00
FranklinPark,Ill. T6	6.35
Ind.Harbor,Ind. I-2	6.35
Ind.Harbor,Ind. Y1	6.25
Indianapolis C8	6.40
Lackawanna,N.Y. B2	6.25
LosAngeles C1	8.30
NewBedford,Mass. R10	6.70
NewBritain(10) S15	6.25
NewCastle,Pa. B4, E5	6.25
NewHaven,Conn. A7, D2	6.70
NewKensington,Pa. A6	6.25
Pawtucket,R.I. R3	6.90
Pawtucket,R.I. N8	6.80
Pittsburgh J5	6.25
Riverdale,Ill. A1	6.35
Rome,N.Y.(32) R6	6.25
Sharon,Pa. S3	6.25
SparrowsPt.,Md. B2	6.25
Trenton,N.J.(31) R5	7.80
Wallingford,Conn. W2	6.70
Warren,O. R2, T5	6.25
Weirton,W.Va. W6	6.25
Worcester,Mass. A7	6.80
Youngstown C8, Y1	6.25

STRIP, Cold-Rolled Alloy

Boston T6	13.80
Carnegie,Pa. S18	13.45
Cleveland A7	13.45
Dover,O. G6	13.45
FranklinPark,Ill. T6	13.45
Harrison,N.J. C18	13.45
Indianapolis C8	13.60
Pawtucket,R.I. N8	13.80
Sharon,Pa. S3	13.45
Worcester,Mass. A7	13.75
Youngstown C8	13.45

STRIP, Cold-Rolled High-Strength Low-Alloy

Cleveland A7	9.10
Dearborn,Mich. D3	9.20
Dover,O. G6	9.30
Ecorse,Mich. G5	9.20
Ind.Harbor,Ind. Y1	9.30

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	7.40	9.35	10.90	13.05	15.75
Boston T6	7.65	9.35	10.90	13.05	15.75
Bristol,Conn. W1	...	...	10.90	13.05	15.75
Carnegie,Pa. S18	...	9.05	10.60	12.75	....
Cleveland A7	7.10	9.05	10.60	12.75	15.45
Cleveland C7	...	9.05	10.60	12.75	15.45
Dearborn,Mich. D3	7.20	9.15	10.70	....	....
Detroit D2	7.20	9.15	10.70	12.85	....
Dover,O. G6	7.10	9.05	10.60	12.75	15.45
FranklinPark,Ill. T6	7.20	9.05	10.60	12.75	15.45
Harrison,N.J. C18	...	...	10.90	13.05	15.75
Indianapolis C8	7.25	9.20	10.60	12.75	15.45
NewBritain,Conn.(10) S15	7.10	9.05	10.60	12.75	15.45
NewCastle,Pa. B4, E5	7.10	9.05	10.60	12.75	....
NewHaven,Conn. D2	7.55	9.35	10.90	13.05	....
NewKensington,Pa. A6	7.10	9.05	10.60	....	....
New York W3	...	9.35	10.90	13.05	15.75
Pawtucket,R.I. N8	7.65	9.35	10.90	13.05	15.75
Riverdale,Ill. A1	7.20	9.05	10.60	12.75	15.45
Rome,N.Y.(32) R6	7.10	9.05	10.60	12.75	15.45
Sharon,Pa. S3	7.10	9.05	10.60	12.75	15.45
Trenton,N.J. R5	...	9.35	10.90	13.05	15.75
Wallingford,Conn. W2	7.55	9.35	10.90	13.05	15.75
Warren,O. T5	7.10	9.05	10.60	12.75	15.45
Weirton,W.Va. W6	7.10	9.05	10.60	12.75	15.45
Worcester,Mass. A7, T6	7.65	9.35	10.90	13.05	15.75
Youngstown C8	7.10	9.05	10.60	12.75	15.45
Spring Steel (Tempered)					
Bristol,Conn. W1	...	...	14.80	18.15	....
Buffalo W12	...	...	14.80	....	....
FranklinPark,Ill. T6	...	...	15.15	18.50	22.35
Harrison,N.J. C18	...	...	14.80	18.15	22.00
NewYork W3	...	...	14.80	18.15	22.00
Trenton,N.J. R5	...	...	14.80	18.15	22.00
Worcester,Mass. W12	...	...	14.80	....	....
Worcester,Mass. A7, T6	...	...	14.80	18.15	22.00
Youngstown C8	...	...	15.15	18.50	22.35

SILICON STEEL

H.R. SHEETS(22 Ga.,cut lengths)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	...	...	9.95	10.95	11.85
Brackenridge,Pa. A4	...	...	9.95	10.95	11.85
Mansfield,O. E6	8.40	9.35	9.95	10.95	11.85
Newport,Ky. N9	8.40	9.35	9.95	10.95	11.85
Niles,O. M21	8.40	9.35	9.95	10.95	....
Vandergrift,Pa. U5	...	9.35	9.95	10.95	11.85
Warren,O. R2	8.40	9.35	9.95	10.95	11.85
Zanesville,O. A10	...	9.35	9.95	10.95	11.85

C.R. COILS & CUT LENGTHS, (22 Ga.) Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
Brackenridge,Pa. A4	....	....	10.70	11.70	12.60
GraniteCity,Ill. G4	8.80*	9.80*	10.40*	11.40*	....
IndianaHarbor,Ind. I-2	8.60†	9.60*	10.20*	11.20*	....
Vandergrift,Pa. U5	8.60*	9.60*	10.20*	11.20*	12.10*
Vandergrift,Pa. U5	....	10.10†	10.70†	11.70†	12.60†
Warren,O. R2	8.60†	10.10	10.70	11.70	12.60

H.R. SHEETS (22 Ga., cut lengths)	Transformer Grade T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	12.80	13.35	13.85	14.85
Brackenridge,Pa. A4	12.80	....	....	....
Newport,Ky. N9	12.80	....	....	....
Vandergrift,Pa. U5	12.80	13.35	13.85	14.85
Zanesville,O. A10	12.80‡	13.35‡	13.85‡	14.85‡

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4	....	15.85	17.45	17.95	18.45	13.55**
Butler,Pa. A10	....	....	17.45	17.95	....	....
Vandergrift,Pa. U5	14.85	15.85	17.45	17.95	....	13.55
Warren,O. R2	....	....	....	....	....	13.55‡

*Semiprocessed. †Fully processed only. ‡Coils, annealed, semiprocessed ½c lower. §Coils, ¾-cent higher. **Cut lengths, ¾-cent lower.

Lackawanna,N.Y. B2	9.10
Sharon,Pa. S3	9.10
SparrowsPoint,Md. B2	9.10
Warren,O. R2	9.10
Weirton,W.Va. W6	9.10
Youngstown Y1	9.30

STRIP, Electrogalvanized

Cleveland A7	6.25*
Dover,O. G6	6.25*
Riverdale,Ill. A1	6.35*
Warren,O. T5	6.25*
Warren,O. B9	6.45*
Weirton,W.Va. W6	5.75*
Worcester,Mass. A7	6.80*
Youngstown C8	6.25*

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Sharon,Pa. S3	6.55

TIGHT COOPERAGE HOOP

Atlanta A11	5.05
Riverdale,Ill. A1	4.90
Sharon,Pa. S3	4.75
Youngstown U5	4.75

TIN MILL PRODUCTS

TIN PLATE Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$7.90	$8.15	$8.55
Dravosburg,Pa. U5	7.90	8.15	8.55
Fairfield,Ala. T2	8.00	8.25	8.65
Fairless,Pa. U5	8.00	8.25	8.65
Gary,Ind. U5	7.90	8.15	8.55
GraniteCity,Ill. G4	8.00	8.25	8.65
IndianaHarbor,Ind. I-2, Y1	7.90	8.15	8.55
Niles,O. R2	7.90	8.15	8.55
Pittsburg,Calif. C11	8.85	8.90	9.30
SparrowsPoint,Md. B2	8.00	8.25	8.65
Weirton,W.Va. W6	7.90	8.15	8.55
Yorkville,O. W10	7.90	8.15	8.55

ELECTROTIN (22-27 Gage; Dollars per 100 lb)

Aliquippa,Pa. J5	6.675	....	....
Niles,O. R2	6.675	6.875	7.075

TINPLATE, American Coke (Base Box)	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$9.20	$9.45
Dravosburg,Pa. U5	9.20	9.45
Fairfield,Ala. T2	9.30	9.55
Fairless,Pa. U5	9.30	9.55
Gary,Ind. U5	9.20	9.45
Ind.Har. I-2, Y1	9.20	9.45
Pitts.,Calif. C11	9.95	10.20
Sp.Pt.,Md. B2	9.30	9.55
Weirton,W.Va. W6	9.20	9.45
Yorkville,O. W10	9.20	9.45

BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$7.00
Dravosburg,Pa. U5	7.00
Fairfield,Ala. T2	7.10
Fairless,Pa. U5	7.10
Gary,Ind. U5	7.00
GraniteCity,Ill. G4	7.10
Ind.Harbor,Ind. I-2, Y1	7.00
Niles,O. R2	7.00
Pittsburg,Calif. C11	7.75
SparrowsPoint,Md. B2	7.10
Warren,O. R2	7.00
Weirton,W.Va. W6	7.00
Yorkville,O. W10	7.00

HOLLOWARE ENAMELING Black Plate (29 Gage)

Dravosburg,Pa. U5	6.65
Gary,Ind. U5	6.65
GraniteCity,Ill. G4	6.75
Ind.Harbor,Ind. Y1	6.65
Yorkville,O. W10	6.65

MANUFACTURING TERNES (Special Coated; Base Box)

Dravosburg,Pa. U5	$8.70
Gary,Ind. U5	8.70
Yorkville,O. W10	8.70

MANUFACTURING TERNES (Light Coated, 6 lb; Base Box)

Yorkville,O. W10	$9.15

ROOFING SHORT TERNES (8 lb Coated; Base Box)

Gary,Ind. U5	$10.25

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2	6.60
Aliquippa,Pa. J5	6.60
Alton,Ill. L1	6.775
Atlanta A11	6.80
Bartonville,Ill. K4	6.35
Buffalo W12	6.60
Chicago W13	6.60
Cleveland A7	6.60
Crawfordsville,Ind. M8	6.70
Donora,Pa. A7	6.60
Duluth,Minn. A7	6.60
Fairfield,Ala. T2	6.60
Fostoria,O.(24) S1	6.80
Houston S5	6.85
Jacksonville,Fla. M8	6.95
Johnstown,Pa. B2	6.60
Joliet,Ill. A7	6.60
KansasCity,Mo. S5	6.85
Kokomo,Ind. C16	6.70
LosAngeles B3	7.55
Minnequa,Colo. C10	6.85
Monessen,Pa. P7	6.60
Newark 6-8 ga. I-1	6.90
N.Tonawanda B11	6.60
Palmer,Mass. W12	6.90
Pittsburg,Calif. C11	7.20
Portsmouth,O. P12	6.60
Rankin,Pa. A7	6.60
S.Chicago,Ill. R2	6.60
S.SanFrancisco C10	7.55
SparrowsPoint,Md. B2	6.70
Sterling,Ill.(1) N15	6.60
Sterling,Ill. N15	6.70
Struthers,O. Y1	6.60
Waukegan,Ill. A7	6.60
Worcester,Mass. A7	6.90

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5	7.90
Alton,Ill. L1	8.075
Bartonville,Ill. K4	8.00
Buffalo W12	7.90
Cleveland A7	7.90
Donora,Pa. A7	7.90
Duluth,Minn. A7	7.90
Fostoria,O. S1	7.95
Johnstown,Pa. B2	7.90
LosAngeles B3	8.85
Milbury,Mass.(12) N6	8.20
Minnequa,Colo. C10	8.15
Monessen,Pa. P16	7.90
Muncie,Ind. I-7	8.10
Palmer,Mass. W12	8.20
Pittsburg,Calif. C11	8.85
Portsmouth,O. P12	7.90
Roebling,N.J. R5	8.20
S.Chicago,Ill. R2	7.90
S.SanFrancisco C10	8.85
SparrowsPt.,Md. B2	8.00
Struthers,O. Y1	7.90
Trenton,N.J. A7	8.20
Waukegan,Ill. A7	7.90
Worcester,Mass. A7,J4,T6,W12	8.20

WIRE, Upholstery Spring

Aliquippa,Pa. J5	7.60
Alton,Ill. L1	7.775
Buffalo W12	7.60
Cleveland A7	7.60
Donora,Pa. A7	7.60
Duluth,Minn. A7	7.60
Johnstown,Pa. B2	7.60
KansasCity,Mo. S5	7.85
LosAngeles B3	8.55
Minnequa,Colo. C10	7.775
Monessen,Pa. P16	7.60
NewHaven,Conn. A7	7.90
Palmer,Mass. W12	7.90
Pittsburg,Calif. C11	8.55
Portsmouth,O. P12	7.60
Roebling,N.J. R5	7.90
S.Chicago,Ill. R2	7.60
S.SanFrancisco C10	8.55
SparrowsPoint,Md. B2	7.70
Struthers,O. Y1	7.60
Trenton,N.J. A7	7.90
Waukegan,Ill. A7	7.60
Worcester,Mass. A7	7.90

WIRE, Fine & Weaving (8" Coils)

Alton,Ill. L1	12.725
Bartonville,Ill. K4	12.65
Buffalo W12	12.55
Chicago W13	12.55
Cleveland A7	12.55
Crawfordsville,Ind. M8	12.65
Fostoria,O. S1	12.55
Jacksonville,Fla. M8	12.90
Johnstown,Pa. B2	12.55
Kokomo,Ind. C16	12.55
Minnequa,Colo. C10	12.30
Monessen,Pa. P6	12.55
Muncie,Ind. I-7	12.75
Palmer,Mass. W12	12.85
Roebling,N.J. R5	12.85
S.SanFrancisco C10	12.90
Waukegan,Ill. A7	12.55
Worcester,Mass. A7,T6	12.85

WIRE, Gal'd ACSR for Cores

Bartonville,Ill. K4	10.70
Buffalo W12	10.70
Johnstown,Pa. B2	10.70
Minnequa,Colo. C10	10.825
Monessen,Pa. P16	10.70
Muncie,Ind. I-7	10.90
Palmer,Mass. W12	11.00
Pittsburg,Calif. C11	11.50
Portsmouth,O. P12	10.70
Roebling,N.J. R5	11.00
SparrowsPt.,Md. B2	10.80
Struthers,O. Y1	10.70

ROPE WIRE	(A)
Bartonville,Ill. K4	10.55
Buffalo W12	10.55
Fostoria,O. S1	10.55
Johnstown,Pa. B2	10.55
Monessen,Pa. P16	10.55
Muncie,Ind. I-7	10.75
Palmer,Mass. W12	10.85
Portsmouth,O. P12	10.55
Roebling,N.J. R5	10.85
SparrowsPt. B2	10.65
Struthers,O. Y1	10.55
Worcester,Mass. J4	10.85

(A) Plow and Mild Plow; add 0.25c for Improved Plow.

WIRE

(Continued)

WIRE, Tire Bead

Bartonville,Ill. K4	14.15
Monessen,Pa. P16	14.20
Roebling,N.J. R5	14.35

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	9.50
Baltimore T6	9.80
Boston T6	9.80
Buffalo W12	9.50
Cleveland A7	9.50
Crawfordsville,Ind. M8	9.00
Dover,O. G6	9.50
Fostoria,O. S1	9.50
FranklinPark,Ill. T6	9.60
Kokomo,Ind. C16	*9.50*
Massillon,O. R8	*9.50*
Milwaukee C23	9.70
Monessen,Pa. P16	9.00
Pawtucket,R.I. N8	9.80
Riverdale,Ill. A1	*9.60*
Rome,N.Y. R6	9.00
Trenton,N.J. R5	9.80
Worcester A7, T6, W12	9.80

NAIL, Stock

To Dealers & Mfrs. (7)	Col.
AlabamaCity,Ala.(44) R2	152
Aliquippa,Pa. J5	152
Atlanta A11	154
Bartonville,Ill. K4	154
Chicago,Ill. W13	152
Cleveland A9	157
Crawfordsville,Ind. M8	154
Donora,Pa. A7	152
Duluth,Minn. A7	152
Fairfield,Ala. T2	152
Galveston,Tex. D7	157
Houston,Tex. S5	157
Jack'ville,Fla.(23) M8	162
Johnstown,Pa. B2	152
Joliet,Ill. A7	152
KansasCity,Mo. S5	157
Kokomo,Ind. C16	154
Minnequa,Colo. C10	157
Monessen,Pa. P7	152
Pittsburg,Calif. C11	171
Rankin,Pa. A7	152
S.Chicago,Ill.(44) R2	152
SparrowsPt.,Md. B2	154
Sterling,Ill.(1) N15	152
Worcester,Mass. A7	158

NAILS, CUT (100 lb keg)

To Dealers (33)	
Conshohocken,Pa. A3	$9.05
Wheeling,W.Va. W10	9.05

STAPLES, Polished Stock

To Dealers & Mfrs. (7)	Col.
AlabamaCity,Ala.(44) R2	152
Aliquippa,Pa. J5	152
Atlanta A11	154
Bartonville,Ill. K4	154
Crawfordsville,Ind. M8	154
Donora,Pa. A7	152
Duluth,Minn. A7	152
Fairfield,Ala. T2	152
Jack'ville,Fla.(23) M8	162
Johnstown,Pa. B2	152
Joliet,Ill. A7	152
Kokomo,Ind. C16	154
Minnequa,Colo. C10	157
Monessen,Pa. P7	152
Pittsburg,Calif. C11	171
Rankin,Pa. A7	152
S.Chicago,Ill.(44) R2	152
SparrowsPt.,Md. B2	154
Sterling,Ill.(1) N15	152
Worcester,Mass. A7	158

TIE WIRE, Automatic Baler (14½ Ga.) (Per 97 lb Net Box)

Coil No. 3150	
AlabamaCity,Ala. R2	$9.45
Bartonville,Ill. K4	9.45
Buffalo W12	9.35
Crawfordsville,Ind. M8	9.45
Donora,Pa. A7	*9.45*
Duluth,Minn. A7	*9.45*
Jacksonville,Fla. M8	9.88
Johnstown,Pa. B2	*9.45*
Joliet,Ill. A7	*9.45*
Kokomo,Ind. C16	9.45
LosAngeles B3	10.14
Minnequa,Colo. C10	9.60
Pittsburg,Calif. C11	*10.23*
S.Chicago,Ill. R2	9.45
SparrowsPt.,Md. B2	*9.55*
Sterling,Ill. N15	9.35

Coil No. 6500 Stand.	
AlabamaCity,Ala. R2	$9.75
Bartonville,Ill. K4	9.75
Buffalo W12	9.65
Crawfordsville,Ind. M8	9.75
Donora,Pa. A7	*9.75*
Duluth,Minn. A7	*9.75*
Jacksonville,Fla. M8	10.18
Johnstown,Pa. B3	*9.75*
Joliet,Ill. A7	*9.75*
Kokomo,Ind. C16	9.75
LosAngeles B3	10.45
Minnequa,Colo. C10	9.90
Pittsburg,Calif. C11	*10.55*
S.Chicago,Ill. R2	9.75
SparrowsPt.,Md. B2	*9.85*
Sterling,Ill. N15	9.65

Coil No. 6500 Interim	
AlabamaCity,Ala. R2	$9.80
Bartonville,Ill. K4	9.80
Buffalo W12	9.70
Crawfordsville,Ind. M8	9.80
Donora,Pa. A7	*9.80*
Duluth,Minn. A7	*9.80*
Jacksonville,Fla. M8	10.23
Johnstown,Pa. B2	*9.80*
Joliet,Ill. A7	*9.80*
Kokomo,Ind. C16	9.80
LosAngeles B3	10.50
Minnequa,Colo. C10	9.95
Pittsburg,Calif. C11	*10.60*
S.Chicago,Ill. R2	9.80
SparrowsPt.,Md. B2	*9.90*
Sterling,Ill. N15	9.70

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	175**
Aliquippa,Pa. J5	172‡
Atlanta A11	181
Bartonville,Ill. K4	181
Crawfordsville,Ind. M8	181
Donora,Pa. A7	175†
Duluth,Minn. A7	175†
Fairfield,Ala. T2	175†
Houston,Tex. S5	180**
Jacksonville,Fla. M8	186
Johnstown,Pa. B2	179*
Joliet,Ill. A7	175†
KansasCity,Mo. S5	180**
Kokomo,Ind. C16	177†
Minnequa,Colo. C10	180**
Monessen,Pa. P7	178††
Pittsburg,Calif. C11	195†
Rankin,Pa. A7	175†
S.Chicago,Ill. R2	175**
S.SanFrancisco C10	195**
SparrowsPoint,Md. B2	181*
Sterling,Ill.(1) N15	179††

WOVEN FENCE, 9-15 ga.

	Col.
Ala.City,Ala. R2	162**
Ala.City, 17 ga. R2	257**
Aliq'ppa,Pa.9-14½ga J5	165‡
Atlanta A11	168
Bartonville,Ill. K4	168
Crawfordsville,Ind. M8	168
Donora,Pa. A7	162†
Duluth,Minn. A7	162†
Fairfield,Ala. T2	162†
Houston,Tex. S5	167**
Jacksonville,Fla. M8	173
Johnstown,Pa.(43) B2	166
Joliet,Ill. A7	162†
KansasCity,Mo. S5	167**
Kokomo,Ind. C16	164†
Minnequa,Colo. C10	167**
Monessen,Pa. 9 ga. P17	166††
Pittsburg,Calif. C11	185†
Rankin,Pa. A7	162†
S.Chicago,Ill. R2	162**
Sterling,Ill.(1) N15	166††

WIRE (16 Gage)	Stone	An'ld Galv. Stone
Ala.City R2	14.50	16.05**
Bartonville K4	14.50	16.55
Buffalo W12	14.50	...
Cleveland A7	14.50	...
Crawf'dsville M8	14.60	16.55
Fostoria,O. S1	14.60	16.15†
Jacksonville M8	14.85	16.80
Johnstown B2	14.50	16.40*
Kokomo C16	14.60	16.15†
Minnequa C10	14.75	16.45**
Palmer,MassW12	14.50	16.05*
Pitts.,Calif. C11	14.85	16.40†
S.Chicago R2	14.50	16.05**
SparrowsPt. B2	14.60	16.50*
Sterling(1) N15	14.50	16.45††
Waukegan A7	14.50	16.05
Worcester A7	14.80	...

WIRE, Merchant Quality

(6 to 8 gage)	An'ld Galv.
Ala.City,Ala. R2	7.50 7.90**
Aliquippa J5	7.40 7.925‡
Atlanta A11	*7.60 8.20*
Bartonville(48) K4	7.50 8.10
Buffalo W12	7.40 8.80†
Cleveland A7	7.50 ...
Crawfordsville M8	7.50 8.10
Donora,Pa. A7	7.50 7.90†
Duluth,Minn. A7	7.50 7.90†
Fairfield T2	7.50 7.90†
Houston(48) S5	7.65 8.05**
Jacks'ville,Fla. M8	7.75 8.35
Johnstown B2(48)	*7.50 8.10**
Joliet,Ill. A7	7.50 7.90†
Kans.City(48) S5	7.65 8.05**
Kokomo C16	7.50 7.90†
LosAngeles B3	8.35 8.925*
Minnequa C10	7.65 8.05**
Monessen P7(48)	7.40 8.00††
Palmer,Mass. W12	7.70 8.10†
Pitts.,Calif. C11	8.45 8.85†
Portsmouth,O. P12	7.40 ...
Rankin A7	7.50 7.90†
S.Chicago R2	7.50 7.90**
S.SanFran. C10	8.35 8.75**
Spar'wsPt. B2 (48)	*7.60 8.20**
Str'ling(1)(48) N15	7.40 8.00††
Struthers,O.(48) Y1	7.40 7.90‡
Worcester,Mass. A7	7.80 8.20†

Based on zinc price of: *13.50c. †5c. ‡10c. §Less than 10c. ††13c. **Subject to zinc equalization extras.

FASTENERS

(Base discounts, full case quantity, per cent off list to consumer, f.o.b. mill)

Carriage, Machine Bolts

Full-Size Body (cut thread)	
†½" x 6" and smaller	61
Larger than ½" diam. and all diams. longer than 6"	55
Under-Size Body (rolled thread; not nutted):	
⅜" x 6" and smaller.	61

†½" x 4" and smaller and shorter are not nutted.

NUTS

Reg. & Heavy Square Nuts, all sizes	61
H. P. Reg. & Heavy Hex Nuts:	
¾" & smaller	64
⅞" to 1⅛" incl.	63
1¼" to 1½" incl.	65
1⅝" & larger	61
C.P. Reg. & Heavy Hex Nuts	
¾" & smaller	64
⅞" & larger	61
Semifinished & Finished Nuts	
¾" & smaller	66
⅞" & larger	63
Semifinished Slotted Reg. & Heavy Hex Nuts	
¾" & smaller	66
⅞" & larger	63
Hot Galvanized Nuts, all types	
1⅛" & smaller	44

(On above items, add 25% for less than case quantities)

CAP SCREWS

(New Std., hexagon head, upset, packages)

Bright:	
6" and shorter:	
¼" through ½" diam.	34
⅝" & ¾" diam.	31
⅞", ⅞", 1"	8
Longer than 6":	
¼" through ¾" diam.	3
⅞" through 1" diam.	+13
High Carbon, Heat-treated:	
6" and shorter:	
¼" through ½" diam.	20
⅝" & ¾" diam.	16
⅞", ⅞", 1"	+11
Longer than 6":	
¼" through ¾" diam.	+23
⅞" through 1" diam.	+41

(New Std. Hexagon head, upset, bulk)

Bright:	
¼" x 6" & smaller & shorter	49
⅝" x ⅝" diam. x 6" & shorter	48
⅞", ⅞", 1" x 6" & shorter	31
High Carbon, Heat-treated:	
¼" x 6" & smaller & shorter	41
⅝" x ⅝" diam. & 6" & shorter	39
⅞", ⅞", 1" x 6" & shorter	20

MACHINE SCREW NUTS & STOVE BOLT NUTS (Bulk)

No. 2 to ⅜" incl., Square:	
25,000 to 199,999 pieces	20
200,000 or more pieces	27
No. 2 to ⅜" incl., Hex.:	
25 000 to 199,999 pieces	18
200,000 or more pieces	25

MACHINE SCREWS, SLOTTED (Bulk)

No. 2 to ¼" diam. incl.:	
25,000 to 199,999 pieces	20
200,000 or more pieces	27
⅝" to ½" diam. incl.:	
15,000 to 99,999 pieces	20
100,000 or more	27

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	21.06	20.42
1¼	13	....	24.94	20.45
1½	13	23.31	27.57	22.61
1¾	13	27.54	32.57	26.71
2	13	30.87	36.51	29.93
2¼	13	34.77	41.12	33.72
2½	12	37.73	44.63	36.60
2¾	12	41.57	49.16	40.31
2¾	12	45.00	53.22	43.65
3	12	47.99	56.76	46.55

RAILWAY MATERIALS

RAILS	Standard No. 1	Standard No. 2	Tee Rails All No. 2	Tee Rails 60 lb Under
Bessemer,Pa. U5	4.725	4.625	4.675	5.65
Ensley,Ala. T2	4.725	4.625	....	5.65
Fairfield,Ala. T2	....	....	....	5.65
Gary,Ind. U5	4.725	4.625	4.675	...
Huntington,W.Va. W7	....	....	....	5.65
IndianaHarbor,Ind. I-2	4.725	4.625	4.675	...
Johnstown,Pa. B2	....	....	...(16)	5.65
Lackawanna,N.Y. B2	4.725	4.625	...(16)	5.65
Minnequa,Colo. C10	4.725	4.625	....	6.15
Steelton,Pa. B2	4.725	4.625	....	...
Williamsport,Pa. S19	....	....	....	5.65

TIE PLATES

Fairfield,Ala. T2	5.625
Gary,Ind. U5	5.625
Ind.Harbor,Ind. I-2	5.625
Lackawanna,N.Y. B2	5.625
Minnequa,Colo. C10	5.625
Seattle B3	5.775
Steelton,Pa. B2	5.625
Torrance,Calif. C11	5.775

TRACK BOLTS, Untreated

Cleveland R2	12.15
KansasCity,Mo. S5	12.90*
Lebanon,Pa. B2	12.15
Minnequa,Colo. C10	12.15
Pittsburgh O3, P14	12.15
Seattle B3	12.65

*Treated

AXLES

Ind.Harbor,Ind. S13	7.50
Johnstown,Pa. B2	7.50

JOINT BARS

Bessemer,Pa. U5	5.825
Fairfield,Ala. T2	5.825
Ind.Harbor,Ind. I-2	5.825
Joliet,Ill. U5	5.825
Lackawanna,N.Y. B2	5.825
Minnequa,Colo. C10	5.825
Steelton,Pa. B2	5.825

SCREW SPIKES

Cleveland R2	11.90
Pittsburgh O3	11.90

STANDARD TRACK SPIKES

Fairfield,Ala. T2	7.90
Ind.Harbor,Ind. I-2, Y1	7.90
KansasCity,Mo. S5	7.90
Lebanon,Pa. B2	*8.05*
Minnequa,Colo. C10	7.90
Pittsburgh J5	7.90
Seattle B3	8.40
S.Chicago,Ill. R2	8.05
Struthers,O. Y1	7.90
Youngstown R2	8.05

METAL POWDER

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

Sponge iron:	Cents
98+% Fe, annealed	9.25
Swedish, c.i.f., Camden, N. J., c.l. in bags	9.50
Domestic, f.o.b., Johnstown, Pa., Riverton, N.J., Niagara Falls, N.Y., in bags	9.50
Canadian, f.o.b. shipping point	9.50
Electrolytic iron:	
Melting stock, 99.9% Fe, irregular fragments of ⅛ in. x 1.3 in.	22.00
Annealed, 99.5% Fe.	36.50
Unannealed (99+% Fe)	34.00
Unannealed (99+% Fe) (minus 325 mesh)	57.00
Powder Flakes (minus 16, plus 100 mesh)	31.00
Carbonyl Iron:	
98.1-99.9%, 3 to 20 microns, depending on grade, 86.00-275.00, in standard 200-lb. containers; all minus 200 mesh.	
Aluminum:	
Atomized, 500 lb. drum frght. allowed	
Cariots	34.50
Ton lots	36.50
Antimony, 500 lb lots	32.00*
Brass, 5000-lb lots	39.75-55.00†
Bronze, 5000-lb lots	66.50-70.75†
Copper:	
Electrolytic	14.25*
Reduced	14.25*
Lead	7.50*
Manganese:	
Minus 35 mesh	64.00
Minus 100 mesh	70.00
Minus 200 mesh	75.00
Nickel, unannealed	$1.00
Nickel-Silver, 5000-lb lots	61.75-64.25†
Phosphor-Copper, 5000-lb lots	68.75
Silicon	47.50
Solder	7.00*
Stainless Steel, 302	99.00
Stainless Steel, 316	$1.32
Tin	14.50*
Zinc 5000-lb lots	19.25-33.00‡
Tungsten Melting grade, 99%	Dollars
60 to 200 mesh:	
1000 lb and over	4.50
Less than 1000 lb.	4.65
Chromium, electrolytic 99.8% Cr min. metallic basis	5.00

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. §70% Cu, 20% Zn, 10% Ni. **64% Cu, 18% Zn, 18% Ni.

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1¼-in. to less than 1 7/16-in.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass., base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ⅜" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(21) New Haven, Conn., base.
(22) Deld. San Francisco Bay area.
(23) Plus 4c per 100 lb.
(24) Deduct 0.10c, finer than 15 Ga.
(25) Bar mill bands.
(26) Delivered in mill zone, 5.25c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝-in.; 6.90c for widths ⅝-in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) 13 Ga. & heavier; 60" & narrower.
(38) 14 Ga. & Lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. in mill zone or within switching limits, 5.25c.
(43) 9-14½ Ga.
(44) Plus 3c per 100 lb.
(48) 6-7 Ga.
(49) 3½-in. and smaller rounds; 7.95c over 3½-in. and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	6.5	+11.5	10.5	+8.25	13	+5.75	14.5	+4.25	14.5	+4.25	14	+4.75	16.5	+2.25
Ambridge, Pa. N2	6.5	...	10.5	...	13	...	14.5	...	14.5	...	14	...	16.5	...
Lorain, O. N3	6.5	+11.5	10.5	+8.25	13	+5.75	14.5	+4.25	14.5	+4.25	14	+4.75	16.5	+2.25
Youngstown Y1	6.5	+11.5	10.5	+8.25	13	+5.75	14.5	+4.25	14.5	+4.25	14	+4.75	16.5	+2.25

ELECTRIC WELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	6.5	+11.5	10.5	+8.25	13	+5.75	14.5	+4.25	14.5	+4.25	14	+4.75	16.5	+2.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	...	...	....	....	....	....	18.5	+0.75	21.5	3.25	24	6.75	26.5	8.5
Alton, Ill. L1	...	...	....	....	....	....	16.5	+2.75	19.5	1.25	22	4.75	24.5	6.5
Benwood, W. Va. W10	17.5	+13	9	+18.5	+0.75	+28.5	18.5	+0.75	21.5	3.25	24	6.75	26.5	8.5
Butler, Pa. F6	18	+12.5	9.5	+18	1.5	+26	...	...	...	...	...	...	...	...
Etna, Pa. N2	...	...	....	....	....	....	18.5	+0.75	21.5	3.25	24	6.75	26.5	8.5
Fairless, Pa. N3	...	...	....	....	....	....	16.5	+2.75	19.5	1.25	22	4.75	24.5	6.5
Fontana, Calif. K1	...	...	....	....	....	....	6	+13.25	9	+9.25	11.5	+5.75	14	+4
Ind. Harbor, Ind. Y1	...	...	....	....	....	....	17.5	+1.75	20.5	2.25	23	5.75	25.5	7.5
Lorain, O. N3	...	...	....	....	....	....	18.5	+0.75	21.5	3.25	24	6.75	26.5	8.5
Sharon, Pa. S4	18	+12.5	9.5	+18	1.5	+26	...	...	...	...	...	...	...	...
Sharon, Pa. M6	...	...	....	....	....	....	18.5	+0.75	21.5	3.25	24	6.75	26.5	8.5
Sparrows Pt., Md. B7	16	+12.5	7.5	+18	+0.5	+25	16.5	+0.75	19.5	3.25	22	6.75	24.5	8
Youngstown R2, Y1	...	...	....	....	....	....	18.5	+0.75	21.5	3.25	24	6.75	26.5	8.5
Wheatland, Pa. W9	18	+12.5	9.5	+18	1.5	+26	18.5	+0.75	21.5	3.25	24	6.75	26.5	8.5

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.73		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	27	9.5	27.5	10	29	10.75	29	10.75	....	...	....	...
Alton, Ill. L1	25	7.5	25.5	8	27	8.75	27	8.75	....	...	....	...
Benwood, W. Va. W10	27	9.5	27.5	10	29	10.75	29	10.75	19.5	0.75	19.5	0.75
Etna, Pa. N2	27	9.5	27.5	10	29	10.75	29	10.75	19.5	0.75	19.5	0.75
Fairless, Pa. N3	25	7.5	25.5	8	27	8.75	27	8.75	17.5	+1.25	17.5	+1.25
Fontana, Calif. K1	14.5	+3	15	+2.5	16.5	+1.75	16.5	+1.75	7	+11.75	7	+11.75
Ind. Harbor, Ind. Y1	26	8.5	26.5	9	28	9.75	28	9.75	18.5	+0.25	18.5	+0.25
Lorain, O. N3	27	9.5	27.5	10	29	10.75	29	10.75	....	...	....	...
Sharon, Pa. M6	27	9.5	27.5	10	29	10.75	29	10.75	....	...	....	...
Sparrows Pt., Md. B2	25	9	25.5	9.5	27	9.75	27	9.75	17.5	+0.25	17.5	+0.25
Youngstown R2, Y1	27	9.5	27.5	10	29	10.75	29	10.75	19.5	0.75	19.5	0.75
Wheatland, Pa. W9	27	9.5	27.5	10	29	10.75	29	10.75	19.5	0.75	19.5	0.75

*Galvanized pipe discounts based on current price of zinc (13.50c, East St. Louis).

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	Rerolling Ingot	Rerolling Slabs	Forging Billets	Seamless Tube Billets	H.R. Strip	Wire Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	18.50	23.00	....	....	31.00	....	....	....	42.25	39.00
202	19.75	25.50	31.00	36.25	33.50	....	36.75	38.75	42.50	42.50
301	19.25	23.75	....	36.75	32.00	36.00	38.00	....	44.25	41.00
302	20.50	26.25	32.00	37.25	34.50	36.25	38.25	40.25	44.50	44.50
302B	20.25	26.50	33.00	37.25	37.75	36.25	38.25	40.25	47.00	47.00
303	....	26.75	34.75	40.00	....	39.00	41.00	....	....	....
304	21.75	27.50	33.75	39.00	37.25	38.25	40.25	43.00	47.25	47.25
304L	....	....	38.75	44.00	42.25	43.25	45.25	48.00	52.25	52.25
305	23.25	30.25	....	39.50	40.25	38.25	40.25	43.50	50.25	50.25
308	23.50	30.50	38.50	44.25	41.25	43.25	45.50	49.75	52.00	52.00
309	31.00	39.75	46.75	53.50	53.50	52.00	54.75	58.25	67.00	67.00
310	37.25	48.00	62.25	72.25	68.50	69.75	73.50	75.25	78.75	78.75
314	....	....	....	....	....	69.75	....	75.25	....	....
316	31.50	40.25	51.25	59.50	58.25	57.75	60.75	64.00	68.25	68.25
316L	....	....	56.25	64.50	63.25	62.75	65.75	69.00	73.25	73.25
317	37.25	48.25	62.75	72.75	75.50	70.75	74.50	77.00	83.75	83.75
321	25.00	32.00	38.25	44.00	44.25	43.00	45.25	49.25	54.25	54.25
18-8CeTa	29.25	38.00	45.75	52.25	53.25	50.75	53.50	58.00	66.50	66.50
403	....	....	28.75	32.75	....	32.25	34.00	36.25	....	....
405	17.50	23.00	26.75	31.00	32.25	30.50	32.00	33.75	42.25	42.25
410	15.00	19.50	25.50	29.50	28.00	29.00	30.50	31.75	36.25	36.25
416	....	....	26.00	30.00	....	29.50	31.00	....	....	....
420	....	30.25	31.00	36.00	37.75	35.50	37.25	40.75	56.00	56.00
430	15.25	19.75	26.00	30.00	28.75	29.50	31.00	32.25	34.50	36.75
430F	....	....	26.50	30.50	....	30.00	31.50	....	....	....
431	....	25.50	33.25	....	....	37.25	39.25	40.75	....	....
446	....	....	35.50	40.50	53.25	40.00	42.00	43.25	63.25	63.25

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; Alloy Metal Wire Co. Inc.; Alloy Tube Div., Carpenter Steel Co.; American Steel & Wire Div., U. S. Steel Corp.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; G. O. Carlson Inc.; Carpenter Steel Co.; Charter Wire Products Co.; Cold Metal Products Co.; Crucible Steel Co. of America; Damascus Tube Co.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Ellwood Ivins Steel Tube Works Inc.; Firth Sterling Inc.; Ft. Wayne Metals Inc.; Globe Steel Tubes Co.; Helical Tube Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Joslyn Mfg. & Supply Co.; Kenmore Metals Corp.; Maryland Fine & Specialty Wire Co.; McLouth Steel Corp.; Metal Forming Corp.; McInnes Steel Co.; National-Standard Co.; National Tube Div., U. S. Steel Corp.; Newman-Crosby Steel Co.; Pacific Tube Co.; Page Steel & Tube Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Rodney Metals Inc.; Rome Mfg. Co.; Rotary Electric Steel Co.; Sharon Steel Corp.; Sawhill Tubular Products Inc.; Simonds Saw & Steel Co., Specialty Wire Co. Inc.; Spencer Wire Corp.; Stainless Welded Products Inc.; Standard Tube Co.; Superior Steel Corp.; Superior Tube Co.; Timken Roller Bearing Co.; Trent Tube Co.; Tube Methods Inc.; Ulbrich Stainless Steels; United States Steel Corp.; Universal-Cyclops Steel Co.; Wallingford Steel Co.; Washington Steel Corp.

Tool Steel

	Plates, Carbon Base 10%	Plates, Carbon Base 20%	Sheets, Carbon Base 20%
302	....	....	30.50
304	30.30	36.05	32.50
304-L	32.30	37.95	....
310	41.30	47.00	....
316	35.50	41.40	47.00
316-L	40.00	46.10	....
316-CB	41.15	48.45	....
321	32.00	37.75	37.25
347	34.40	41.40	48.25
405	25.80	33.35	....
410	25.30	32.85	....
430	25.30	32.85	....
Inconel	49.45	65.45	....
Nickel	41.05	55.65	....
Nickel, Low Carbon	43.25	60.05	....
Monel	42.35	56.35	....
Copper*	....	....	46.00

	Strip, Carbon Base, Cold Rolled 10%	Strip, Carbon Base, Cold Rolled Both Sides
Copper*	32.75	41.25

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Clad Steel

Grade	$ per lb	Grade	$ per lb
Regular Carbon	0.275	5% Cr Hot Work	0.430-0.460
Extra Carbon	0.330	W-Cr Hot Work	0.450
Special Carbon	0.390	V-Cr Hot Work	0.470
Oil Hardening	0.430	Hi-Carbon-Cr	0.770

Grade by Analysis (%)

W	Cr	V	Co	Mo	$ per lb
20.25	4.25	1.6	12.25	...	4.090
18.25	4.25	1	4.75	...	2.305-2.475
18	4	2	9	...	2.675-2.6775
18	4	2	....	...	1.765
18	4	1	....	...	1.600
13.75	3.75	2	5	...	2.245
13.5	4	3	....	...	1.865
9	3.5	..	....	...	1.130
6	4	2	....	5	1.105
6	4	3	....	6	1.350
1.5	4	1	....	8.5	0.960

Tool steel producers include: A4, A8, B2, B8, C4, C9 C13, C18, D4, F2, J3, M14, S8, U4, V2 and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax.

Birmingham District	Basic	No. 2 Foundry	Malleable	Bessemer
AlabamaCity,Ala. R2	54.50	....	....	....
Birmingham R2	54.50	55.00‡	....	....
Birmingham U6	....	55.00‡	59.00	....
Woodward,Ala. W15	54.50	55.00‡	59.00	....
Cincinnati, deld.	....	62.70	....	....
Buffalo District				
Buffalo H1, R2	58.50	59.00	59.50	60.00
Tonawanda,N.Y. W12	60.00	60.50	61.00	61.50
N.Tonawanda,N.Y. T9	....	*60.50*	*61.00*	*61.50*
Boston, deld.	69.15	69.65	70.15	....
Rochester,N.Y. deld.	61.52	62.02	62.52	....
Syracuse,N.Y. deld.	62.62	63.12	63.62	....
Chicago District				
Chicago I-3	*60.00*	*60.50*	*60.50*	*61.00*
Gary,Ind. U5	58.50	....	59.00	....
S.Chicago R2	58.50	....	59.00	....
S.Chicago,Ill. Y1	*60.00*	*60.50*	*60.50*	*61.00*
S.Chicago,Ill. U5, W14	*60.00*	....	*60.50*	*61.00*
Milwaukee, deld.	*62.30*	*62.80*	*62.80*	*63.30*
Muskegon,Mich. deld.	....	*67.18*	*67.18*	....
Cleveland District				
Cleveland A7, R2	58.50	59.00	59.00	59.50
Akron,O., deld.	61.25	61.75	61.75	62.25
Lorain,O. N3	58.50	....	....	59.50
Mid-Atlantic District				
Bethlehem,Pa. B2	*62.00*	*62.50*	*63.00*	*63.50*
NewYork, deld.	....	*66.51*	*67.01*	....
Newark, deld.	*65.20*	*65.70*	*66.20*	*66.70*
Birdsboro,Pa. B10	62.00	62.50	63.00	63.50
Chester,Pa. P14	*62.00*	*62.50*	*63.00*	....
Philadelphia, deld	*63.76*	*64.26*	*64.70*	....
Steelton,Pa. B2	*62.00*	*62.50*	*63.00*	*63.50*
Swedeland,Pa. A3	*62.00*	*62.50*	*63.00*	*63.50*
Philadelphia, deld.	*63.76*	*64.26*	*64.76*	*65.26*
Troy,N.Y. R2	60.50	61.00	61.50	62.00
Pittsburgh District				
NevilleIsland,Pa. P6	*60.00*	*60.50*	*60.50*	....
Pittsburgh (N&S sides), Aliquippa, deld.	....	*61.95*	*61.95*	*62.48*
McKeesRocks, deld.	....	*61.60*	*61.60*	*62.13*
Lawrenceville,Homestead, Wilmerding,Monaca, deld.	....	*62.26*	*62.26*	*62.79*
Verona,Trafford, deld.	*62.29*	*62.82*	*62.82*	*63.35*
Brackenridge, deld.	*62.60*	*63.10*	*63.10*	*63.63*
Bessemer,Pa. U5	58.50	....	59.00	59.50
Clairton,Rankin,S.Duquesne,Pa. U5	58.50	....	....	....
McKeesport,Pa. N3	58.50	....	....	59.50
Midland,Pa. C18	58.50	....	....	....

Youngstown District	Basic	No. 2 Foundry	Malleable	Bessemer
Hubbard,O. Y1	....	....	59.00	....
Sharpsville,Pa. S6	*60.00*	....	*60.50*	*61.00*
Youngstown Y1	....	....	59.00	59.50
Youngstown U5	58.50	....	....	59.50
Mansfield,O., deld.	63.40	....	63.90	64.40
Duluth I-3	*60.00*	*60.50*	*60.50*	*61.00*
Erie,Pa. I-3	*60.00*	*60.50*	*60.50*	*61.00*
Everett,Mass. E1	62.00	62.50	63.00	....
Fontana,Calif. K1	66.00	66.50	....	....
Geneva,Utah C11	58.50	59.00	....	....
GraniteCity,Ill. G4	60.40	60.90	61.40	....
Ironton,Utah C11	58.50	59.00	....	....
LoneStar,Texas L6	....	55.00*	....	....
Minnequa,Colo. C10	62.00	62.50	63.00	....
Rockwood,Tenn. T3	..	55.00‡	59.00	...
Toledo,O. I-3	*60.00*	*60.50*	*60.50*	*61.00*
Cincinnati, deld.	*65.76*	*66.26*	....	....

*Phos. 0.51-0.75%; $56, Phos. 0.31-0.50%.
‡Intermediate (Phos. 0.31-0.69%), $56.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.

Nickel: Under 0.05% no extra; 0.50-0.74%, inclusive, add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1.25 for each 0.5% Si; 75 cents for each 0.50% Mn over 1%)

Jackson,O. G2, J1	$67.50
Buffalo H1	68.75

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

NiagaraFalls,N.Y. P15	$91.00
Keokuk,Iowa, (Open-hearth & Fdry, freight allowed K2)	95.50
Keokuk, O.H. & Fdry, 12½ lb piglets, 16% Si, frgt allowed K2	98.50

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles,Tenn. T3 (Phos. 0.035% max)	$72.50
Rockwood,Tenn. T3 (Phos. 0.035% max)	72.50
Steelton,Pa. B2 (Phos. 0.035% max)	*68.00*
Philadelphia, deld.	70.05
Troy,N.Y. R2 (Phos. 0.035% max)	66.50
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	63.50
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	63.50
Erie,Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	63.50
Pittsburgh P6 (Intermediate) (Phos. 0.036-0.075% max)	*65.00*

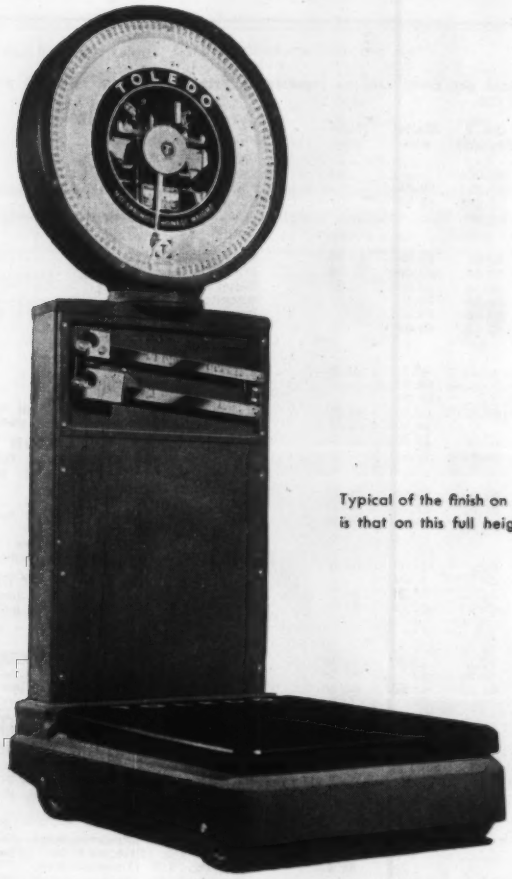
Warehouse Steel Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 15 cents per 100 lb except: St. Paul, 25 cents; Moline, Norfolk, Richmond, Washington, 20 cents; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, San Francisco, 10 cents; Atlanta, Houston, Seattle, Spokane, no charge.

	SHEETS				STRIP	BARS				Standard Structural Shapes	PLATES	
	Hot-Rolled	Cold-Rolled	Gal. 10 Ga.†	Stainless Type 302	Hot-Rolled*	H.R. Merchant Qual.	H.R. Spec. Qual.	C.F. Rds.‡	H.R. Alloy 4140††§		Carbon	Floor
Atlanta	7.14	8.20	8.87	....	7.40	7.42	...	9.39	....	7.63	7.49	9.48
Baltimore	7.24	8.35	8.50	....	7.70	7.70	...	8.49[8]	14.39	7.94	7.56	9.02
Birmingham	7.13	8.24	8.85	....	7.21	7.27	7.80	9.35	....	7.43	7.45	9.50
Boston	8.12	9.07	10.32	53.32	8.21	8.27	8.56	9.73	13.56	8.27	8.41	9.84
Buffalo	7.20	8.25	10.01	....	7.35	7.35	8.05	7.90	13.35	7.60	7.65	9.00
Chattanooga	7.28	8.44	8.60	....	7.36	7.42	7.95	9.18	....	7.63	7.60	9.32
Chicago	7.13	8.24	9.10	46.75	7.21	7.27	7.80	7.75	13.05	7.43	7.45	8.72
Cincinnati	7.25	8.23	9.10	46.10	7.45	7.51	8.04	8.15	13.29	7.90	7.74	8.97
Cleveland	7.13	8.24	8.95	49.16	7.31	7.33	7.86	8.00	13.11	7.76	7.62	8.89
Detroit	7.32	8.43	9.38	43.50	7.49	7.55	8.08	8.04	13.25	7.90	7.73	8.91
Erie, Pa.	7.08	8.24	8.95[10]	....	7.31	7.35	...	8.10[10]	....	7.65	7.30	8.79
Houston	7.85	8.75	10.49	....	8.15	8.25	...	9.85	14.00	8.20	7.80	9.20
Jackson, Miss.	7.46	8.52	9.22	....	7.44	7.59	8.12	9.44	....	7.75	7.77	9.44
Los Angeles	8.15	10.00	11.00	51.50	8.50	8.15	8.70	10.90	14.35	8.30	8.75	10.85
Milwaukee	7.22	8.33	9.19	....	7.30	7.36	7.89	7.94	13.14	7.60	7.54	8.81
Moline, Ill.	7.15	8.44	8.85	....	7.41	7.43	...	8.10	....	7.63	7.34	...
New York	7.78	8.88	9.73	53.13	8.23	8.16	8.71	9.77	13.47	8.11	8.21	9.50
Norfolk, Va.	7.35	...	...	....	7.80	7.85	...	9.95	....	8.10	7.60	9.10
Philadelphia	7.34	8.44	9.41	45.98	7.99	7.73	8.26	8.52	13.25	7.75	7.72	8.83**
Pittsburgh	7.13	8.24	9.40	49.00	7.21	7.27	7.80	8.00	13.05	7.43	7.45	8.72
Portland, Oreg.	7.80	8.80	10.65	....	8.00	7.95	...	12.20	15.00	7.85	7.75	9.60
Richmond, Va.	7.25	...	9.49	....	7.85	7.85	...	9.50	....	8.10	7.50	9.35
St. Louis	7.42	8.53	9.69	43.89	7.50	7.56	8.09	8.29	13.34	7.83	7.74	9.01
St. Paul	7.46	8.59	9.16	....	7.72	7.74	...	8.51	13.51	7.94	7.65	9.12
San Francisco	8.20	9.65	10.15	51.65	8.35	8.15	8.70	11.45	14.35[9]	8.25	8.30	10.50
Seattle	7.85	10.50	10.90	54.00	8.90	8.60	9.15	12.25	14.65	8.50	8.50	10.70
Spokane	8.75	11.00[7]	10.90	....	8.90	8.60	9.15	12.25	15.40	8.50	8.50	11.20
Washington	7.78	9.80	8.60	....	8.49	8.24	...	9.40	....	8.51	8.11	9.56

*Prices do not include gage extras; †prices include gage and coating extras (based on 13.50-cent zinc), except in Birmingham (coating extra excluded); ‡includes 35-cent special bar quality extras; **⅛-in. and heavier; ††as annealed; §§under ⅛-in.

Base quantities. 2000 to 4999 lb except as noted; Cold-rolled strip and cold-finished bars, 2000 lb and over except in Seattle, 2000 to 9999 lb, and in Los Angeles, 6000 lb and over; stainless sheets, 8000 lb except in Chicago, New York and Boston, 10,000 lb, and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb; [2]—500 to 9999 lb; [3]—400 to 999 lb; [4]—4000 lb and over; [5]—1000 to 1999 lb; [6]—1000 lb and over; [7]—1500 to 3999 lb; [8]—2000 to 3999 lb; [9]—f.o.b. local delivery in lots of 10,000 lb and over; [10]—2000 lb and over.



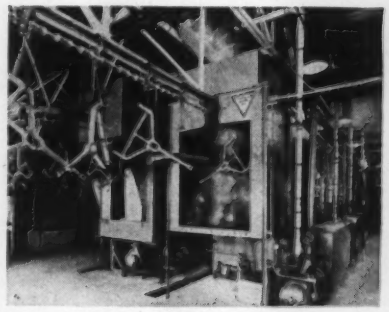
Typical of the finish on all Toledo Scales is that on this full height portable unit.

BOTH STEEL AND ALUMINUM PARTS ARE PROCESSED IN THE SAME 6-STAGE MACHINE AT TOLEDO SCALE

Steel parts are Granodized, aluminum parts are Alodized to inhibit corrosion and provide an excellent base for the high-grade finish used on these familiar products

Toledo Scale knows that the fundamental prerequisite of a good paint job is a properly prepared base material upon which the finish is to be applied. To provide this all-important base, it Granodizes most steel parts with Granodine® and Alodizes most aluminum parts with Alodine.® Granodizing is a chemical process for the treatment of iron and steel which converts metallic surfaces to a nonmetallic coating of the proper texture for inhibiting corrosion and greatly increasing the adhesion and durability of the paint finish. Alodizing performs the same functions on aluminum parts.

Both of these processes are performed in the same 6-stage machine. And both add to the long life of the Toledo finish. Perhaps these ACP processes can be used effectively in your plant. Complete data about both of them are available upon request. Write us.



Part of 6-stage machine in Granodizing Department at Toledo Scale Co.

AMERICAN CHEMICAL PAINT COMPANY, Ambler 19, Pa.

DETROIT, MICHIGAN NILES, CALIFORNIA WINDSOR, ONTARIO

CHEMICALS ACP PROCESSES

Shipments of Metal Powder in the U.S.

(In Short Tons)

Year	Iron*	Grain Copper	Copper-Base Alloy	Lead	Solder
1955	31,710	11,565	9,600	3,300	860
1954	17,670	9,670	4,645	2,370	675
1953	13,220	11,515	na	na	na
1952	9,680	8,920	na	na	na
1951	16,580	11,960	na	na	na
1950	11,550	12,135	na	na	na
1949	5,970	5,125	na	755	535
1948	5,910	8,130	na	855	275
1947	3,030	8,570	na	780	na
1946	2,490	7,370	na	905	na
1945	1,955	6,550	na	4,655	na
1944	1,720	6,760	na	1,440	na
1943	2,135	6,430	na	725	na

na — not available
* Includes both domestic and imported
Source: Metal Powder Association

Metal Powder Use Grows

Iron leads the way, but new uses are being found for other metals as powder metallurgy establishes itself as one of the important processes of industry

SHIPMENTS of metal powder in 1955 increased nearly 63 per cent over 1954, and powder metallurgy still is growing by leaps and bounds, declares the Metal Powder Association, New York.

Robert L. Ziegfeld, secretary of the association, says that 57,035 tons of the principal powders—iron, grain copper, copper-base alloys, lead and solder—were shipped last year, compared with only 35,030 tons the year before. While all powdered metals have contributed to this rapid growth, iron powder has made the most spectacular gains.

Big Leap—MPA figures show that in 1943 only 2135 tons of the black powder were shipped, all of it domestically produced (see table above). Since that time, the tonnage has increased about 16 times. As the market began to grow after World War II, consumers had to import the powder, and today about one-third of our supply still comes from abroad. But the domestic industry has added to its capacity and now supplies about ten times the tonnage it did 12 years ago.

The association made a survey in late 1954 which indicated that domestic capacity to produce iron powder was well in excess of even 1955 requirements. "Domestic capacity is estimated at a little over 50,000 tons, including some capacity which needs at least some additional equipment to bring it into production. The gap between production and capacity is still large, therefore, although the industry's growth is closing that gap," Mr. Ziegfeld says.

Reasons—Two factors are paramount in the growth pattern in 1955, Mr. Ziegfeld states. "First, since the use of iron powder for bearings and parts grew about in proportion to the total, the high level of business, particularly in the automotive industry, and the use of powder metallurgy for more and more different parts must have been major factors. Second, new uses—like welding rod flux coatings and cutting and scarfing of steel and concrete, which are growing tremendously—upped the miscellaneous classification also about in proportion to the total growth."

Last year, bearings and parts consumed 33,100 tons of the total shipments, accounting for about half the domestic iron powder and two-thirds of the copper powder. Miscellaneous uses, which include welding rods and cutting and scarfing, accounted for 19,200 tons, and friction materials took 2100 tons. Magnetic cores required over 1000 tons of powdered iron. Nearly 700 tons of lead powder were used in lubricants. Graphite metal brushes consumed about 850 tons of copper powder.

Over 30 Kinds—"When we consider that MPA's Data Sheet on Available Metal Powders shows some 30 different powders and that many of those cover a variety of alloy compositions, we can only begin to realize how important powder metallurgy has become," says Mr. Ziegfeld.

The association is holding its annual meeting in Cleveland at the Hotel Cleveland next week, Apr. 10 to 12. The meeting will include not only technical sessions but also a show where powder producers, parts fabricators and press, furnace and other manufacturers will show their products.

Stainless Steel . . .

Stainless Steel Prices, Page 136

Officials of Washington Steel Corp., Washington, Pa., are receiving favorable reports from distributors, after they lowered the price of type 430 stainless steel sheets $45 per ton last week. The company points out that type 430 can be used in such fields as production of appliances and cars, where type 302 is used.

Sheets, Strip . . .

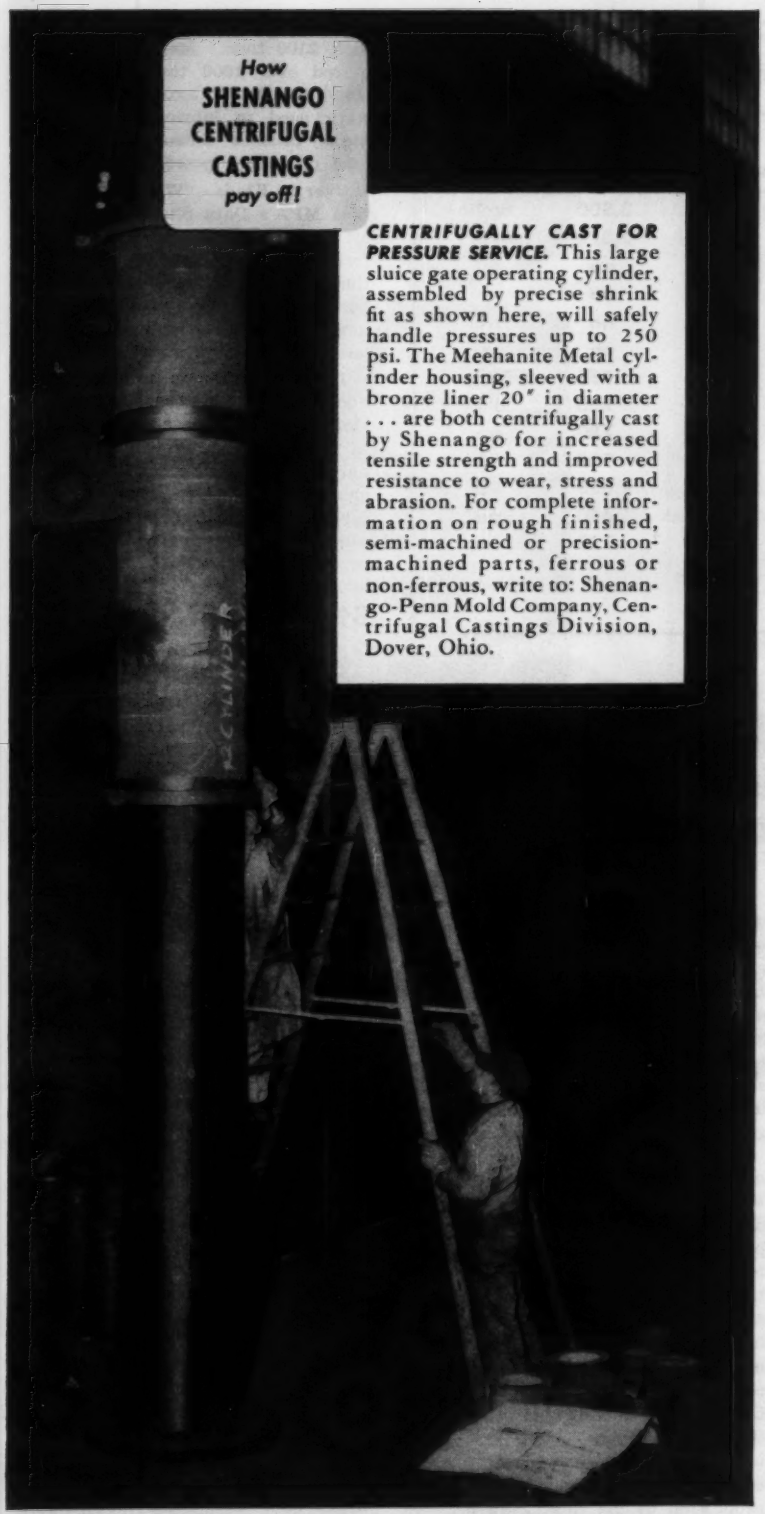
Sheet & Strip Prices, Pages 133 & 134

Some leading sheetmakers are entering the second quarter with arrearages of almost a month in both hot and cold-rolled sheets. This situation exists despite automotive cutbacks and determined efforts to bring commitments into balance with supplies. Carry-overs, however, will be the lightest in at least nine months.

Producers generally do not appear concerned over their ability to keep production going full tilt throughout the second quarter. The only possible reason why production can't be maintained at capacity pace will be operational difficulties.

Supply and demand are in good balance in galvanized sheets. But orders for this product are beginning to show a seasonal pickup. Demand for enameling stock and electrical sheets is strong; also for chrome nickel sheets, with far more inquiry than can be promptly handled.

Various buyers, including automotive, who, earlier in the year had either cut back on their orders, or had shown no interest in obtaining more tonnage than they were scheduled to receive, now are endeavoring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to increase their orders, but without much success.

An easing in sheet supply may develop in the third quarter due to seasonal influences, and because of heavy second quarter buying as a hedge against a possible steel strike this summer and likely higher prices at midyear.

Tubular Goods . . .

Tubular Goods Prices, Page 136

Merchant pipe sales are increasing seasonally for construction applications. Miscellaneous industrial requirements also are high, due to generally high-level industrial activity.

Oil country tubemakers set some individual plant production records in February. Users are preparing for a record-breaking year of well drilling.

Cast iron pipe sellers anticipate a sharp seasonal pickup in buying. Last week's awards in the Pacific Northwest were reported in excess of 500 tons. Substantial tonnage in small lots is moving out of stock.

Ferroalloys . . .

Ferroalloy Prices, Page 145

New Jersey Zinc Co. has advanced prices on all grades of spiegeleisen $2.50 a gross ton, effective with April shipments. Under the new schedule, the 16-19 per cent manganese grade has been increased to $92, Palmerton, Pa., 19-21 to $94, and 21-23 to $96.50. Change reflects higher costs, and brings the market more in line with ferromanganese, on which increases were recently announced. The last advance on spiegeleisen amounted to $3.50 and was announced Dec. 15, 1955, on shipments on and after Jan. 1, this year.

Steel Bars . . .

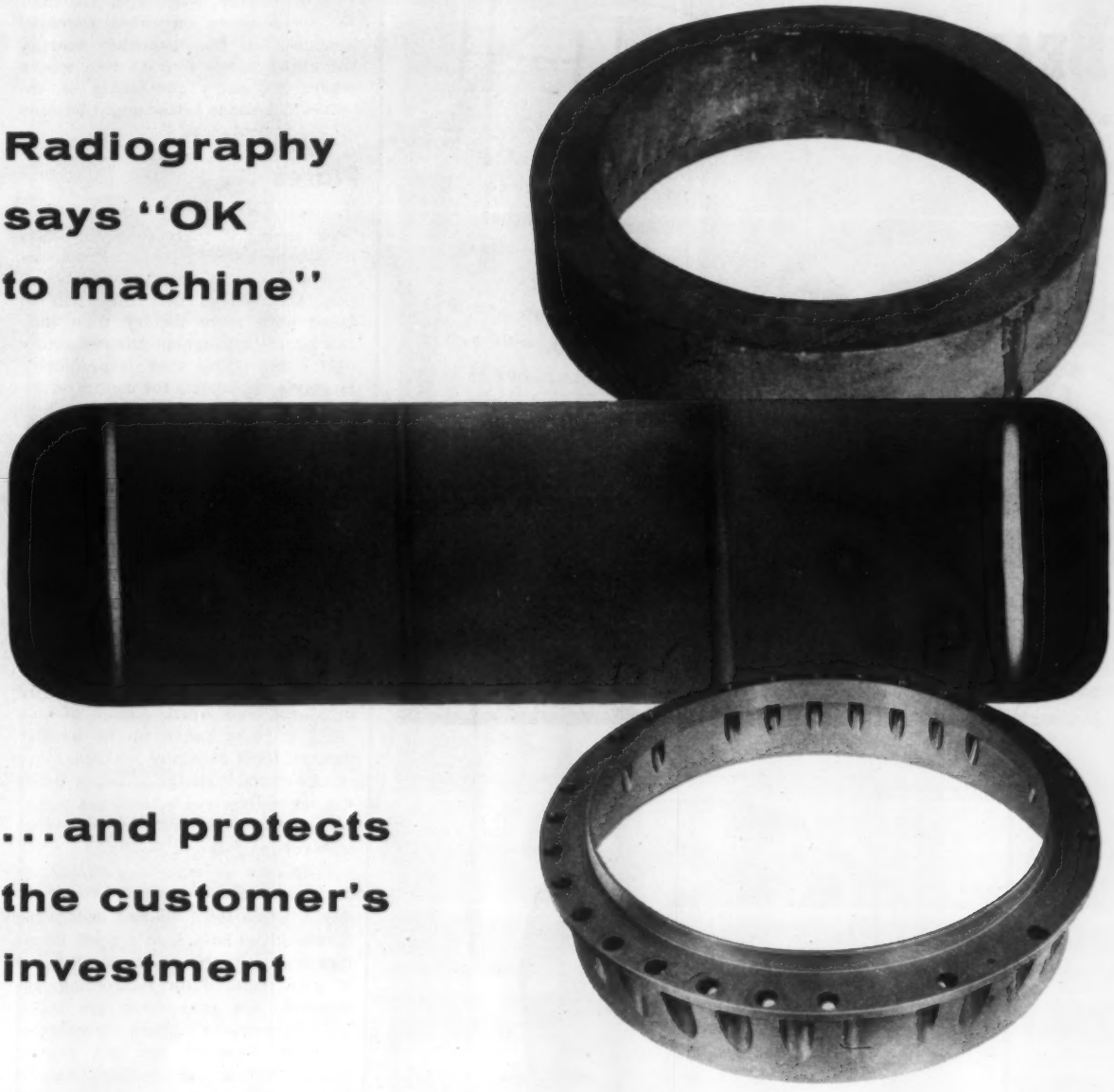
Bar Prices, Page 132

Hot-rolled carbon bar producers have reduced arrearages to the lowest point in about a year. Still, they are two to three weeks behind on commitments, and whether they will be able to draw any closer in the course of the second quarter is doubtful.

Some mills report they are well booked up through the second quarter. Others, however, are looking for business. In general, despite the slowdown in automotive demand, supplies continue tight, except that the situation is a little easier in the case of cold-finished tonnage.

Small bars, ⅞-in. rounds and under, are in noticeably tight supply in the East. So are the nickel-bearing alloys. Some producers are un-

Radiography says "OK to machine"



...and protects the customer's investment

The blank for this stainless steel jet engine part starts as a mill rolled bar, is shaped under heat and pressure, and flash-welded to form a homogeneous ring. Any porosity or lack of fusion could put the part in the scrap-heap—scrapping with it the buyer's investment of machining time which is five times the cost of the blank itself.

To guard its customers against such losses, The American Welding & Manufacturing Co., Warren, Ohio, makes extensive use of radiographic inspection. Only rings with welds *proved* sound are delivered to the buyer. Possible loss of machining time—with costs as great as $300—is avoided at the outset.

Radiography does a great job for welding. It saves time and money as in this case. It gives customers great confidence and peace of mind. It opens new applications where the welding process was once frowned on.

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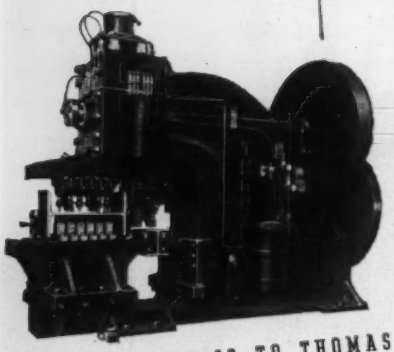

THE newly designed Thomas Beam Punches are built in sizes to handle beams up to 12"-18"-24"-30" and 36", web and flange punching, with a single tool set-up. Any of the five sizes may be used with or without a Thomas spacing Table, depending on production needs.

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able to promise delivery in less than 12 weeks, even on rated tonnage. Promises on the nonnickel bearing hot alloys range four to five weeks where no extra processing is involved. A shade better might be done in a few instances.

Plates . . .

Plate Prices, Page 132

No easing in plate supply appears in prospect for months. Producers still are turning away tonnage business and believe that they will be faced with more inquiry than they can handle throughout the remainder of the year. This view is predicated largely on prospects for continued active needs for heavy building construction, railroad car equipment, tanks and line pipe, industrial equipment and machinery and increasing needs for shipbuilding.

Wire . . .

Wire Prices, Pages 134 & 135

Automotive cutbacks have resulted in a shift in product mix at one major wire plant in the Pittsburgh area. Spring manufacturers reduced their purchases of high-carbon wire in March and April. Some of this slack is being taken up by heavier demand from furniture makers. More of the excess tonnage is being taken by low-carbon users, such as appliance producers and miscellaneous wire-forming shops.

Producers of manufacturers wire have backlogs averaging about 60 days. Some third quarter orders for special types have been placed. Backlogs are noticeably heavy in all types of wire required for reinforcing. Indications are consumers are building inventories. Most consumers in New England are not buying much tonnage in anticipation of higher prices or a possible steel strike.

Structural Shapes . . .

Structural Shape Prices, Page 132

Structural steel delivery promises extend 12 months and longer in many cases. Some of the smaller shops can do better, but the average delivery time is becoming more extended.

On a recent 1300-ton institutional project in the East, none of the fabricators who quoted bid less than 12 months.

While considerable work is being figured, awards are relatively light. This is particularly true of Pennsylvania state bridge work. Following a brisk start in January, when more than 19,000 tons came out for figures, inquiry dropped sharply to little more

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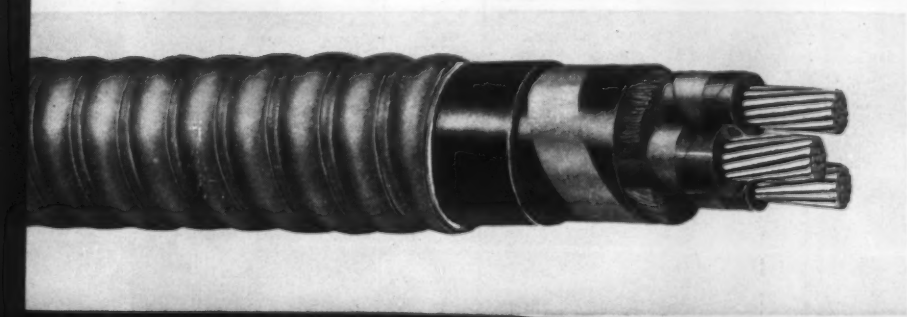
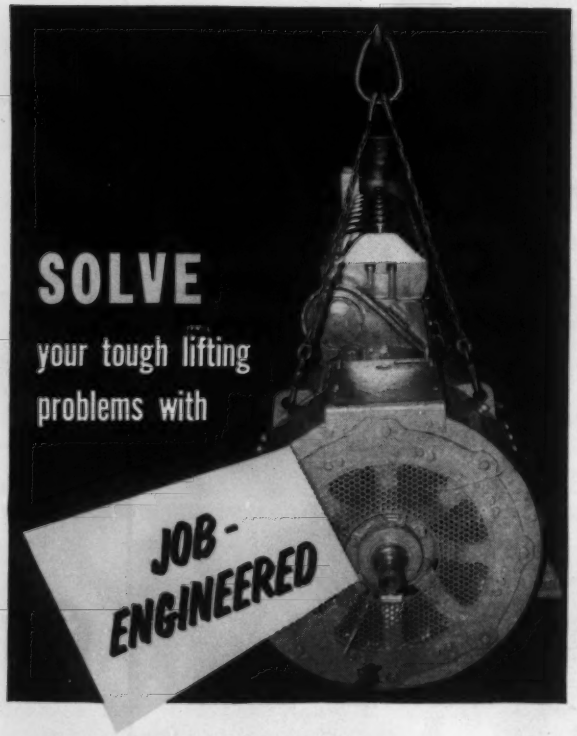
The Man from Anaconda, or your nearest Anaconda distributor, will be happy to give you full information. Or write to: Anaconda Wire & Cable Company, 25 Broadway, New York 4, New York.

ASK THE MAN FROM ANACONDA®
FOR INTERLOCKED-ARMOR CABLE



Anaconda Interlocked-armor cable comes in sizes No. 6 Awg to 750 Mcm—copper or aluminum—up to 15 kv—Underwriters' approval for 600 volts and 5000 volts. Available with rubber-, plastic- or varnished-cambric-type insulation.



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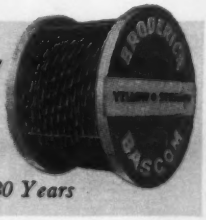

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Current Ferroalloy Quotations

MANGANESE ALLOYS

Spiegeleisen: Carlot, per gross ton, Palmerton, Pa. 21-23% Mn, $96.50; 19-21% Mn, 1-3% Si, $94; 16-19% Mn, $92.

Standard Ferromanganese: (Mn 74-76%, C 7% approx.) Base price per net ton $205. Duquesne, Johnstown, Sheridan, Pa.; Philo, O.; Tacoma, Wash.; Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively.

(Mn 79-81%). Lump $213 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

Low-Carbon Ferromanganese, Regular Grade: (Mn 85-90%). Carload, lump, bulk, max, 0.07% C, 31.95c per lb of contained Mn, carload packed 33c, ton lots 34.5c, less ton 35.7c. Delivered. Deduct 1.5c for max 0.15% C grade from above prices, 3c for max 0.30% C, 3.5c for max 0.50% C, and 6.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk 22.85c per lb of contained Mn, packed, carload 23.9c, ton lot 25.5c, less ton 26.7c. Delivered. Spot, add 0.25c.

Manganese Metal: 2" x D (Mn 95.5% min, Fe 2% max, Si 1% max, C 0.2% max). Carload, lump, bulk, 45c per lb of metal; packed, 45.75c; ton lot 47.25c; less ton lots 49.25c. Delivered. Spot, add 2c.

Electrolytic Manganese Metal: Min carload, 31.5c; 2000 lb to min carload, 33.5c; 250 lb to 1999 lb, 35.5c. Premium for hydrogen-removed metal, 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or to any point east of Mississippi; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk 1.50% C grade, 18-20% Si, 12c per lb of alloy. Packed, c.l. 13c, ton 13.45c, less ton 14.45c, f.o.b. Alloy, W. Va., Ashtabula, O., Marietta, O., Sheffield, Ala., Portland, Oreg. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. For 3% C grade, Si 12-14.5%, deduct 0.4c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lots 2" x D, $1.50 per lb of contained Ti; less ton $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lots $1.35, less ton $1.37 f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $200 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4.5%). Contract $225 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l., lump, bulk 26.25c per lb of contained Cr; c.l. packed 27.5c, ton lot 29.25c, less ton 30.65c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-71%). Contract, carload, lump, bulk, C 0.025% max (Simplex) 31.75c per lb contained Cr, 0.02% max 38.50c, 0.03% max 38c, 0.06% max 36.50c, 0.1% max 36c, 0.15% max 35.75c, 0.2% max 35.50c, 0.5% max 35.25c, 1.0% max 34c, 1.5% max 33.85c, 2.0% max 33.75c. Ton lot, add 3.1c, less ton add 4.8c. Carload packed add 1.45c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). Contract, c.l. 2 in. x D, bulk 27.4c per lb contained Cr. Packed, c.l. 28.7c, ton 30.5c, less ton 32c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, Low-Carbon: (Cr 50-54%, Si 28-32%, C 1.25% max). Contract, carload, packed 8 M x D, 19.6c per lb of alloy, ton lot 20.85c; less ton lot, 22.05c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome-Silicon: (Cr 39-41%, Si 42-49%, C 0.05% max). Contract, carload, lump, 4" x down and 2" x down, bulk, 39.05c per lb of contained Cr; 1" x down, bulk 39.8c. Delivered.

Chromium Metal, Electrolytic: Commercial grade (Cr 99.8% min, metallic basis, Fe 0.2 max). Contract, carlot, packed 2" x D plate (about ¼" thick) $1.25 per lb, ton lots $1.27, less ton lots $1.29. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth Grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.10 per lb of contained V. Delivered. Spot, add 10c. **Special Grade** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.20. **High Speed Grade** (V 50-55%, or 70-75%, Si 1.50% max, C 0.20% max) $3.30.

Grainal: Vanadium Grainal No. 1, $1.05 per lb; No. 6, 68c; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lots, packed, $1.33 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 20.0c per lb of contained Si. Packed 21.40c; ton lot 22.50c f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 12.75c per lb of contained Si. Packed, c.l. 14.85c, ton lot 16.3c, less ton 17.95c. F.o.b. Alloy, W. Va., Ashtabula, Marietta, O., Sheffield, Ala., and Portland, Oreg. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.2c to 50% ferrosilicon prices.

65% Ferrosilicon: Contract, carload, lump, bulk, 14.5c per pound contained silicon. Packed, c.l. 16.2c, ton lots, 18c; less ton, 19.35c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Contract, carload, lump, bulk, 15.4c per lb of contained Si. Packed, c.l. 17.05c, ton lot 18.7c, less ton 19.95c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Contract, carload, lump, bulk, 18.5c per lb of contained Si. Packed, c.l. 19.95c, ton lot 21.35c, less ton 22.4c. Delivered. Spot, add 0.25c.

Silicon Metal: (Min 98% Si, 0.75% max Fe, 0.07 max Ca). C.l. lump, bulk, 20.5c per lb of Si. Packed, c.l. 21.95c, ton lot 23.25c, less ton 24.25c. Add 0.5c for max 0.03 Ca grade. Deduct 0.5c for max 2% Fe grade analyzing min 96.5% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 10.65c per lb of alloy, ton lots packed 11.8c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l. lump, bulk 8.5c per lb of alloy. Packed, c.l. 9.5c, ton lot 10.65c, less ton 11.5c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Contract, carload, lump, packed 26.25c per lb of alloy, ton lot 27.4c, less ton 28.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices, 100 lb and over, are as follows: Grade A (10-14% B) 85c per pound; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). $5.25 per lb contained B, delivered to destination.

Bortam: (B 1.5%-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 1 to 2%). Contract, lump, carloads 9.50c per lb, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 22c per lb of alloy, carload packed 23.05c, ton lot 24.95c, less ton 25.95c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Contract, carload, lump, bulk 21.5c per lb of alloy, carload packed 22.95c, ton lot 25.25c, less ton 26.75c. Delivered. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3% lb each and containing 2 lb of Cr). Contract, carload, bulk, 16.95c per lb of briquet, carload packed in box pallets 17.15c, in bags 17.85c; 3000 lb to c.l. in box pallets 18.35c; 2000 lb to c.l. in bags, 19.05c; less than 2000 lb in bags 19.95c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing 2 lb of Mn). Contract, carload, bulk 13c per lb of briquet, c.l. packed, pallets 13.2c, bags 14c; 3000 lb to c.l., pallets 14.4c; 2000 lb to c.l. bags, 15.2c, less ton 16.1c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 13.55c per lb of briquet, c.l. packed, pallets, 13.75c; bags 14.55c, 3000 lb to c.l., pallets, 14.95c; 2000 lb to c.l., bags, 15.75c; less ton 16.65c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing 2 lb of Si). Contract, carload, bulk 7.15c per lb of briquet; packed, pallets, 7.35c; bags, 8.15c; 3000 lb to c.l., pallets, 8.95c; 2000 lb to c.l. bags 9.75c; less ton 10.65c. Delivered. Spot, add 0.25c.

(Small size—Weighing approx. 2½ lb and containing 1 lb of Si). Carload, bulk 7.3c. Packed, pallets 7.5c; bags 8.30c; 3000 lb to c.l. pallets 9.1c; 2000 lb to c.l. bags 9.9c; less ton 10.8c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each) $1.33 per pound of Mo contained, f.o.b. Langeloth, Pa.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%), 5000 lb W or more $3.45 per lb of contained W; 2000 lb W to 5000 lb W, $3.55; less than 2000 lb W, $3.67. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 8% max, C 0.4% max). Contract, ton lot, 2" x D, $6.90 per lb of contained Cb. Delivered. Spot, add 10c.

Ferrotantalum—Columbium: (Cb 40% approx., Ta 20% approx., and Cb plus Ta 60% min C 0.30% max). Ton lots, 2" x D, $4.65 per lb of contained Cb plus Ta, delivered; less ton lots $4.70.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx.) Contract, c.l. packed ½ in. x 12 M, 18.5c per lb of alloy, ton lots 19.65c, less ton 20.9c. Delivered. Spot, add 0.25c.

Graphidox No. 5: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 18.5c per lb of alloy, ton lots 19.65c; less ton lots 20.9c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 17.2c per lb of alloy; ton lots 18.7c; less ton lots 19.95c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Siminal: (Approx. 20% each Si, Mn, Al; bal. Fe). Lump, carload, bulk 17.50c. Packed c.l. 18.50c, 200 lb to c.l. 19.50c, less than 2000 lb 20c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $4 for each 1% of P above or below the base; carload, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn., $90 per gross ton.

Ferromolybdenum: (55-75%). Per lb contained Mo, in 200-lb containers, f.o.b. Langeloth, Pa., $1.54 in all sizes except powdered which is $1.66; Washington, Pa., furnace, any quantity $1.46.

Technical Molybdic-Oxide: Per lb contained Mo, f.o.b. Langeloth, Pa.; $1.31 in cans; in bags, $1.30, f.o.b. Langeloth, Pa.; $1.24, Washington, Pa.

than 500 tons in February and possibly 100 tons or so in March. Virtually nothing is up for bids in April so far.

There has been fairly sustained inquiry for road building and more than usual for concrete bridges. Fabricators ascribe the lag in demand for structural steel bridges as due in part to the sold-up condition of shops.

Warehouse . . .

Warehouse Prices, Page 137

Warehouses continue under pressure for those steel items (plates and structurals) in shortest supply at the mill level. With mill allotments unchanged and tonnage moving out to consumers almost as quickly as received, it is practically impossible for the distributors to keep anything like a supply balance in these items.

Much the same situation holds for the other products. Sheets are in somewhat better availability. The same is true of bars. The warehouses can sell all the tonnage they can obtain, but some sellers anticipate soft spots to develop in demand in such products as merchant pipe, manufacturers wire, galvanized sheets and fasteners.

Imported Steel Prices Firm

Demand for imported steel is steady, with delivery promises by Western European producers on the major products tightening. Promises on commercial bars now average four months; on standard shapes, four to six months; and on wide flange sections, five to seven months. Plates are quoted for delivery in four to six months, and hot rolled sheets, three months.

This situation reflects not only relatively good demand here but also active domestic requirements in the countries of production and in certain other parts of the world.

Prices have advanced $4 a ton on I-beams and $2 a ton on furring channels. Most other items are strong but unchanged.

Inquiry continues particularly strong for oil country pipe. Deliveries range seven to nine months, it is reported.

Steel Import Prices

(Base per 100 lb, landed, duty paid. Source of shipment: Western continental European countries)

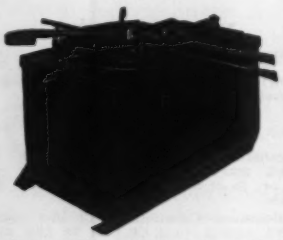
	North Atlantic	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A-305	$6.80	$6.80	$6.80	$7.20
Bar Size Angles	6.80	6.80	6.80	7.20
Structural Angles	6.80	6.80	6.80	7.20
I-Beams	*7.20*	*7.20*	*7.20*	*7.60*
Wide Flange Beams	7.00	7.00	7.00	7.40
Plates	8.50	8.50	8.50	8.90
Sheets, H.R.	9.00	9.00	9.00	9.40
Furring Channels, C.R., 1000 ft, ¾ x 0.30 lb per ft	*28.63*	*28.63*	*28.63*	*30.46*
Barbed Wire (†)	6.10	6.10	6.10	6.45
Merchant Bars	*6.80*	*6.80*	*6.80*	*7.20*
Hot-Rolled Bands	7.10*	7.10*	7.10*	7.50*
Wire Rods, Thomas Commercial No. 5	*6.40*	*6.40*	*6.40*	*6.80*
Wire Rods, O-H Cold Heading Quality No. 5	*6.90*	*6.90*	*6.90*	*7.30*
Bright Common Wire Nails	7.50	7.50	7.50	7.90

Oil Country Pipe: Prices on all sizes equalized with Pittsburgh plus barge freight to New Orleans and Houston, where available.

*Nominal. †Per 82-lb. net, reel. ‡Per 100-lb kegs. 20d nails and heavier

KARDONG FOUR-WAY BENDER
For Concrete Reinforcing Bars

Model D-2



The Model D-2 Kardong Bender is a Four Direction Horizontal Bender. With this bender it is not necessary to turn bars over to make reverse or second bends on beam bars. The Model D-2 is made in two sizes, Model D-2 Standard 6-inch, which will bend bars around collars 2-inch to 6-inch, and Model D-2 Special 8-inch, which will bend bars around collars 2-inch to 8-inch. Capacity of both models, 1¼-inch Square Bars. The Model D-2 is a production bender for reinforcing steel fabricating shop. Ask for catalog of our complete line of reinforcing bar benders.

KARDONG BROTHERS, INC.
MINNEAPOLIS 13, MINN.

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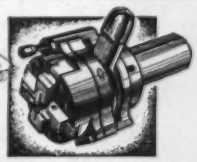
famous for accuracy and straightness of threads, low chaser costs, less downtime, more pieces per day.



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Pacific Coast Representative: *A. C. Berbringer, Inc., 334 N. San Pedro St., Los Angeles, California.* Canada: *F. F. Barber Machinery Co., Toronto, Canada.*

for Corrugating and Complete Line of Culvert Equipment—Slitting and Coiling Equipment for Ferrous and Non-Ferrous Material in All Capacities—Warehouse and Steel Mill Cut to Length Lines for Shearing and Levelling Sheets from Coils—Shears for Shearing Sheets and Plates Both Underdriven and Overdriven Types in Capacities to 1¼" Plate.

STAMCO, Inc., New Bremen, Ohio

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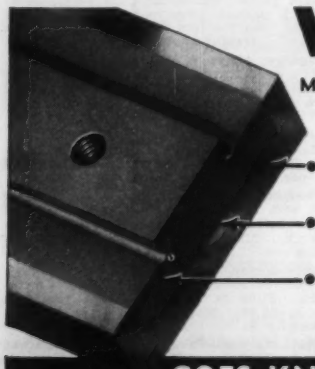
MODERN INTERCHANGEABLE MACHINE WAYS TO YOUR SPECIFICATION.
Wear and Shock Resistant • Precision Ground • Replaceable



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• Machineable Steel for TOUGHNESS

Hardened and ground tool steel inseparably welded to tough, machineable backings. The basic forge welding process was developed by Coes for the production of all types of machine knives, including:
METAL CUTTING SHEAR BLADES.

Ask for literature, or send sketches of your requirements to:

COES KNIFE COMPANY, Worcester, Massachusetts - Est. 1830

Ores

Lake Superior Iron Ore

(Prices effective for the 1956 shipping season, gross ton, 51.50% iron natural, rail of vessel, lower lake ports)

Old range bessemer	$11.25
Old range nonbessemer	11.10
Mesabi bessemer	11.00
Mesabi nonbessemer	10.85
Open-hearth lump	12.10
High phos.	10.85

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Dec. 1, 1955, and increases or decreases after such date are for seller's account.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

Foundry and basic 52-62% concentrates contract	17.00-18.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60-63%	20.00
N. African hematite (spot)	nom. 18.00-20.00

Brazilian iron ore, 68-69% 13.00c, f.o.b. Victoria.

Tungsten Ore

Net ton unit, before duty

Foreign, wolframite, good commercial quality	$34.00-$34.50
Domestic, scheelite, mine	63.00

Manganese Ore

Mn 48%, delivery within six months, $1.15 nom. per long ton unit, c.i.f. U. S. ports, duty for buyer's account; 46-47%, $1.05 nom.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and African

48% 2.8:1	nom. $45.00-$50.00
48% 3:1	42.00-44.00
48% no ratio	34.00

South African Transvaal

44% no ratio	$19.00-$20.00
48% no ratio	33.00-35.00

Domestic

Rail nearest seller

18% 3:1	$39.00

Molybdenum

Sulphide concentrate, per lb of Mo content, mines, unpacked	$1.10

Antimony Ore

Per unit of Sb content, c.i.f. seaboard

55-60%	$3.60-$3.85
60-65%	3.85-4.00

Vanadium Ore

Cents per lb V_2O_5 content, deld. mills	
Domestic	31.00

Refractories

Fire Clay Brick (per 1000)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, O., Ottawa, Ill., Stevens Pottery, Ga., $122; Salina, Pa., $127; Niles, O., $133.

Super-Duty: Ironton, O., Vandalia, Mo., Olive Hill, Ky., Clearfield, Pa., New Savage, Md., St. Louis, $150.

Silica Brick (per 1000)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Windham, Portsmouth, O., Hawstone, Pa., $128; Warren, Niles, O., Hays, Pa., $133; Morrisville, Pa., $131.60; E. Chicago, Ind., Joliet, Rockdale, Ill., $138; Lehigh, Utah, $144; Los Angeles, $151.

Super Duty: Hays, Sproul, Hawstone, Pa., Warren, Windham, O., Leslie, Md., Athens, Tex., $145; Morrisville, Pa., Niles, O., $148; Joliet, Ill., $151; Curtner, Calif., $163.

Semisilica Brick (per 1000)

Clearfield, Pa., $139; Philadelphia, $124; Woodbridge, N. J., $122.

Ladle Brick (per 1000)

Dry Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Pa., Mexico, Vandalia, Mo., $88.50; Wellsville, O., $92.50; Clearfield, Pa., Portsmouth, O., $98.

High-Alumina Brick (per 1000)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $194; Danville, Ill., $197; Philadelphia, Clearfield, Pa., $201.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $241; Danville, Ill., $244; Philadelphia, Clearfield, Pa., $248.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $279; Danville, Ill., $281; Clearfield, Pa., Philadelphia, $286.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $157; Clearfield, Pa., $158.50; St. Louis, $169.30.

Nozzles (per 1000)

Reesdale, Pa., $263.70; Johnstown, Pa., $259.20; Clearfield, Pa., $259.40; St. Louis, $259.45; Bridgeburg, Pa., $258.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $196; Clearfield, Pa., $198; St. Louis, $195.80.

Dolomite (per net ton)

Domestic, dead-burned bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, O., Gibsonburg, Narlo, O., $15; Thornton, McCook, Ill., $15.60; Dolly Siding, Bonne Terre, Mo., $14.

Magnesite (per net ton)

Domestic, dead-burned, bulk, ¼-in. grains with fines: Chewelah, Wash., $40; Luning, Nev., $40. ¾-in. grains with fines: Baltimore, $68.40.

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, furnace	$13.75-14.50
Connellsville, foundry	16.00-17.00

Oven Foundry Coke

Birmingham, ovens	$25.65
Cincinnati, deld.	30.88
Buffalo, ovens	27.50
Buffalo, deld.	33.75
Camden, N. J., ovens	26.50
Chicago, ovens	27.00
Chicago, deld.	28.50
Detroit, ovens	27.50
Detroit, deld.	28.50
Pontiac, deld.	29.06
Saginaw, deld.	30.58
Erie, Pa., ovens	27.50
Everett, Mass., ports, New England, deld.	*28.55
Indianapolis, ovens	26.75
Ironton, O., ovens	26.00
Cincinnati, deld.	28.59
Kearny, N. J., ovens	26.75
Lone Star, Tex., ovens	19.50
Milwaukee, ovens	27.50
Neville Island, (Pittsburgh) Pa., ovens	26.25
Painesville, O., ovens	27.50
Cleveland, deld.	29.43
Philadelphia, ovens	26.50
St. Louis, ovens	26.50
St. Paul, ovens	26.50
Swedeland, Pa., ovens	26.50
Terre Haute, Ind., ovens	26.75

*Or within $4.55 freight zone from works.

Coal Chemicals

Spot, cents per gallon, ovens

Pure benzene	36.00
Toluene, one deg.	32.00-34.00
Industrial xylene	32.00-35.00

Per ton, bulk, ovens

Ammonium sulphate	$42-$45
Birmingham area	42.00†

†With port equalization against imports.

Cents per pound, producing point

Phenol: Grade 1, 15.00; Grade 2-3, 14.50; Grade 4, 16.50; Grade 5, 1525.

Fluorspar

Metallurgical grades, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $38-$39; 70%, $35-$36; 60%, $31-$32. Imported, net tons, f.o.b. cars point of entry, duty paid, metallurgical grade: European, $34; Mexican, $26.50.

Electrodes

Threaded with nipple, unboxed, f.o.b. plant

GRAPHITE

Inches Diam	Inches Length	Per 100 lb
2	24	$52.50
2½	30	33.75
3	40	32.00
4	40	30.25
5½	40	30.00
6	60	27.25
7	60	26.75
8, 9, 10	60	24.25
12	72	27.25
14	60	23.50
16	72	22.50
17	60	23.00
18	72	22.50
20	72	22.25

CARBON

8	60	12.10
10	60	11.80
12	60	11.75
14	60	11.70
14	72	10.85
17	60	10.75
17	72	10.55
20	84	10.30
20	90	10.10
24	72, 84	10.30
24	96	10.05
30	84	10.20
40, 35	110	9.90
40	100	9.90

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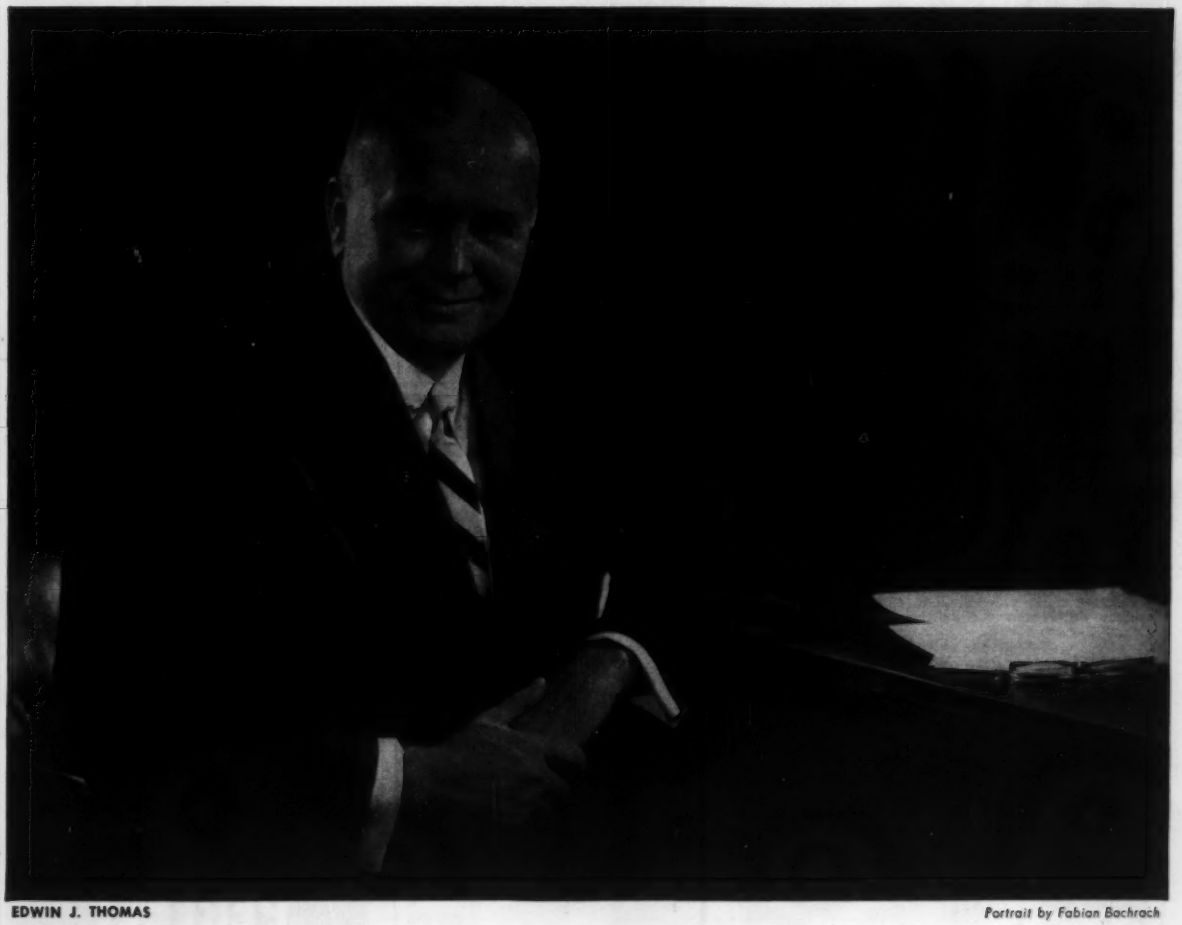

EDWIN J. THOMAS

Portrait by Fabian Bachrach

"...added over 20,000 employees to The Payroll Savings Plan."

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STEEL
The Metalworking Weekly

Scrap . . .

Scrap Prices, Page 150

Pittsburgh—One major steelmaker here bought a small but significant tonnage of No. 1 heavy melting scrap at $54 last week. It also paid $48 for No. 2 heavy melting and $46 for No. 2 bundles. The price was $6 above the amount paid for No. 1 heavy melting by that firm last month, when it made a slightly larger purchase. Brokers have been paying up to $51 to cover $48 orders for the principal scrap grade in the last half of March. Other grades have moved up $1 or $2.

Philadelphia—Prices have taken a further sharp spurt on relatively small buying by district independent mills. The Fairless, Pa., consumer bought No. 1 steel at $53. Strength is attributed in part to scarcity of material at dealers' yards and to urgent need for scrap at some consuming plants. Export requirements also are being stepped up, although some assert that not too much significance should be ascribed to this as some of the Midwest markets were the first to show strength on the present movement.

Cleveland—A substantial purchase of top-quality steelmaking scrap by a valley mill at $59, delivered, has pushed prices up sharply on the steel grades both in the Valley and here. Generally, No. 1 heavy melting is quoted $57-$58 in the Valley, and $54-$55 here. Relative scarcity of scrap and high steelmaking operations contribute to market strength.

Chicago — Once more the scrap market here is close to or at all-time high prices. In the last few days, quotations on steelmaking grades have inched up $2 to $6 a ton. Part of the strength is reflected in broker-dealer transactions, but subsequent mill purchases of a few grades have confirmed the bullish market swing. Shortages are developing in some grades as steelmaking continues at near capacity output. Cast grades so far are not following the upward trend.

Boston — Steel scrap prices are firmer on limited new buying. The trend is expected to continue as consumers re-enter the market for tonnage. Higher freight to Pittsburgh will cut deeper into shipments to that area from New England. Although recent yard receipts were down, stocks in most cases are fair, ample in the secondary grades.

New York—Scrap brokers have advanced buying prices on several grades reflecting the strength now dominating various district markets. They are offering $45-$47 for No. 1 heavy melting and No. 1 bundles, $39-$40 for No. 2 heavy melting and $34-$35 for No. 2 bundles. Prices for machine shop turnings have been increased to $28-$30; mixed borings and turnings to $29-$31; short shovel turnings to $32-$33; and low phos structural and plate to $48-$50. Unstripped motor blocks are higher at $31-$33.

Buffalo—Heavy demand for area scrap for shipment to Youngstown has resulted in an increase of about $3 a ton in the price of No. 1 heavy melting steel here. Brokers are getting $50-$51 for No. 1 heavy melting for shipment to the Ohio Valley. Machine shop turnings also are quoted $1 higher at $28.

Cincinnati—Prices have moved up $1 per ton on all grades. Brokers think the current strength could develop a runaway market situation, especially should consumers rush the market for anticipated requirements.

Detroit—The scrap market here is being influenced by revival of demand for finished steel in the auto industry. This is notably true in the case of electric furnace scrap. The rising demand for scrap stemming from the pickup in auto steel requirements is expected to influence higher scrap prices shortly.

St. Louis—Scrap prices have skyrocketed here, with brokers' purchase rates going up in almost every category. Increases ranged from $1 to $6.50. Biggest rises were in re-rolling rails (from $65 to $70.50) and angles and splice bars ($54 to $60.50).

All other rail scrap is higher. Also: Heavy melting scrap, bundles, bushheling, machine shop turnings and short shovel turnings. Cast iron grades showed a price advance in each group, with the exception of brake shoes and clean auto cast.

Birmingham — The scrap market continues weak. Many dealers, especially in the Carolinas, are shipping to northern consumers. Two open-hearth buyers in this area halted shipments after making sizable purchases. The steel export market and the cast iron market appear strong, but no price changes are reported.

Los Angeles—Machine shop turnings are off $1 to $17 per ton and area dealers anticipate further decline. Market instability is attributed to several factors, chiefly erratic mill purchases and increasing availability of offshore scrap.

San Francisco — Underlying strength prevails in the local steel scrap market, with mills continuing to melt as much metal as ever. One large consumer is operating at 113 per cent of rated capacity. Its furnaces are on a virtual 100-per-cent-scrap charge.

Seattle—Scrap is stronger. While No. 1 and No. 2 heavy melting are unchanged at $38 and $35, respectively, recent Navy sales indicate underlying strength. At the Puget Sound yard 400 tons of No. 1 prepared brought $41.56, and 1000 tons of unprepared were bid at $34.67, to which freight of $2.70 to Seattle must be added.

The mills have recently specified two categories, for No. 2 heavy melting offering $35 for 3 ft or less, and $33 for 5 ft or more. Other current prices: No. 1 bundles, $35; No. 2, $26; motor blocks, $35; No. 1 cupola, $40-$42.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 147

Production of coke in January totaled 6,915,071 net tons, reports the U. S. Bureau of Mines. This compares with 6,865,032 tons in the preceding month and with 5,805,926 in January, 1955. Of total production in the month, 6,660,284 tons were oven coke and 254,787 tons, beehive.

Stocks of oven coke held by producers at the end of January were 1,648,673 tons, equal to 7.7 days of production. At the end of December the total was 1,697,200 tons, and at the end of January a year ago, the total was 2,747,638 tons.

Pig Iron . . .

Pig Iron Prices, Page 137

Several producers announced increases of $1.50 per ton on the various grades of pig iron, starting with the announcement Mar. 25 by Colorado Fuel & Iron Corp. and subsidiaries. Other makers to take similar action up to the middle of last week included Alan Wood Steel Co., Pitts-

(*Please turn to page* 152)

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Iron and Steel Scrap

Consumer prices, per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Mar. 28	$53.50
Mar. 21	49.83
Feb. Avg.	48.96
Mar. 1955	37.50
Mar. 1951	44.00

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania

PITTSBURGH

No. 1 heavy melting	*53.00-54.00*
No. 2 heavy melting	*47.00-48.00*
No. 1 bundles	*53.00-54.00*
No. 2 bundles	*45.00-46.00*
No. 1 busheling	*53.00-54.00*
Machine shop turnings	*36.00-37.00*
Mixed borings, turnings	*36.00-37.00*
Short shovel turnings	*40.00-41.00*
Cast iron borings	*40.00-41.00*
Cut structurals, 3 ft lengths	*59.00-60.00*
Heavy turnings	*46.00-47.00*
Punching & plate scrap	*59.00-60.00*
Electric furnace bundles	*53.00-54.00*

Cast Iron Grades

No. 1 cupola	*51.00-52.00*
Charging box cast	*47.00-48.00*
Heavy breakable cast	*47.00-48.00*
Unstripped motor blocks	*34.00-35.00*
No. 1 machinery cast	*56.00-57.00*

Railroad Scrap

No. 1 R.R. heavy melt.	57.50-58.50
Rails, 2 ft and under	68.00-69.00
Rails, 18 in. and under	69.00-70.00
Rails, random lengths	63.00-64.00
Railroad specialties	61.00-62.00

Stainless Steel Scrap

18-8 bundles & solids	330.00-340.00
18-8 turnings	225.00-235.00
430 bundles & solids	110.00-120.00
430 turnings	60.00-65.00

CLEVELAND

No. 1 heavy melting	*54.00-55.00*
No. 2 heavy melting	*47.00-48.00*
No. 1 bundles	*54.00-55.00*
No. 2 bundles	*40.00-41.00*
No. 1 busheling	*54.00-55.00*
Machine shop turnings	29.00-30.00
Mixed borings, turnings	33.00-34.00
Short shovel turnings	33.00-34.00
Cast iron borings	33.00-34.00
Low phos.	56.00-57.00
Cut structural plates 2 ft and under	57.00-58.00
Alloy free, short shovel turnings	37.00-38.00
Electric furnace bundles	*54.00-55.00*

Cast Iron Grades

No. 1 cupola	54.00-55.00
Charging box cast	47.00-48.00
Stove plate	52.00-53.00
Heavy breakable cast	46.00-47.00
Unstripped motor blocks	30.00-32.00
Brake shoes	41.00-42.00
Clean auto cast	54.00-55.00
Burnt cast	41.00-42.00
Drop broken machinery	55.00-56.00

Railroad Scrap

No. 1 R.R. heavy melt.	54.00-55.00
R.R. malleable	60.00-61.00
Rails, 2 ft and under	70.00-71.00
Rails, 18 in. and under	71.00-72.00
Rails, random lengths	66.00-67.00
Cast steel	59.00-60.00
Railroad specialties	59.00-60.00
Uncut tires	60.00-61.00
Angles, splice bars	65.00-66.00
Rails, rerolling	68.00-69.00

Stainless Steel

(Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	345.00-355.00
18-8 turnings	205.00-215.00
430 clips, bundles, solids	105.00-115.00
430 turnings	55.00-65.00

YOUNGSTOWN

No. 1 heavy melting	*57.00-58.00*
No. 2 heavy melting	*43.00-44.00*
No. 1 bundles	*57.00-58.00*
No. 2 bundles	*40.00-41.00*
No. 1 busheling	*57.00-58.00*
Machine shop turnings	29.00-30.00
Short shovel turnings	34.00-35.00
Cast iron borings	34.00-35.00
Low phos.	*58.00-59.00*
Electric furnace bundles	*57.00-58.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*57.00-58.00*

CHICAGO

No. 1 heavy melting	*52.00-55.00*
No. 2 heavy melting	*43.00-44.00*
No. 1 factory bundles	*55.00-56.00*
No. 1 dealer bundles	*51.00-53.00*
No. 2 bundles	*40.00-41.00*
No. 1 busheling	*52.00-55.00*
Machine shop turnings	*29.00-30.00*
Mixed boring, turnings	*31.00-32.00*
Short shovel turnings	*31.00-32.00*
Cast iron borings	*31.00-32.00*
Cut structurals, 3 ft	*56.00-57.00*
Punchings & plate scrap	*57.00-58.00*

Cast Iron Grades

No. 1 cupola	48.00-49.00
Stove plate	*43.00-44.00*
Unstripped motor blocks	38.00-39.00
Clean auto cast	53.00-54.00
Drop broken machinery	*54.00-55.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*57.00-58.00*
R.R. malleable	*63.00-64.00*
Rails, 2 ft and under	*71.00-72.00*
Rails, 18 in. and under	*72.00-73.00*
Angles, splice bars	*66.00-67.00*
Rails, rerolling	*72.00-73.00*

Stainless Steel Scrap

18-8 bundles & solids	345.00-360.00
18-8 turnings	250.00-260.00
430 bundles & solids	105.00-110.00
430 turnings	*55.00-60.00*

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*45.00-47.00*
No. 2 heavy melting	*32.00-33.00*
No. 1 bundles	*47.00*
No. 2 bundles	*34.00*
No. 1 busheling	*47.00*
Machine shop turnings	*22.50*
Mixed borings, turnings	*23.00*
Short shovel turnings	*26.00*
Punchings & plate scrap	*57.00*

Cast Iron Grades

No. 1 cupola	*45.00*
Charging box cast	*38.00*
Stove plate	*38.00*
Heavy breakable	*37.00*
Unstripped motor blocks	*26.00*
Clean auto cast	*49.00*
Malleable	*44.00*

BIRMINGHAM

No. 1 heavy melting	37.00-38.00
No. 2 heavy melting	34.00-35.00
No. 1 bundles	37.00-38.00
No. 2 bundles	27.00-28.00
No. 1 busheling	37.00-38.00
Cast iron borings	21.00-22.00
Short shovel turnings	27.00-28.00
Machine shop turnings	26.00-27.00
Electric furnace bundles	*42.00-43.00*

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	47.50-48.00
Stove plate	44.50-45.50
Bar crops and plate	51.00-52.00
Structural & plate, 2 ft.	49.00-50.00
Unstripped motor blocks	37.00-38.00
Charging box cast	32.00-33.00
No. 1 wheels	37.00-38.00

Railroad Scrap

No. 1 R.R. heavy melt.	47.00-48.00
Rails, 18-in. and under	60.00-61.00
Rails, rerolling	61.00-62.00
Rails, random lengths	57.00-58.00
Angles, splice bars	57.00-58.00

PHILADELPHIA

No. 1 heavy melting	*53.50*
No. 2 heavy melting	*46.00*
No. 1 bundles	*53.50*
No. 2 bundles	*44.00*
No. 1 busheling	*53.50*
Electric furnace bundles	*55.00†*
Mixed borings, turnings	*36.00*
Machine shop turnings	*36.00-37.00*
Short shovel turnings	*39.00-40.00*
Heavy turnings	*49.00-50.00*
Structurals & Plates	*57.00-58.00*
Couplers, springs, wheels	*60.00*
Rail crops, 2 ft & under	*65.00-66.00*

Cast Iron Grades

No. 1 cupola	49.00-50.00
Malleable	68.00
Heavy breakable cast	53.00
Drop broken machinery	55.00

†Nominal

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	*45.00-47.00*
No. 2 heavy melting	*39.00-40.00*
No. 1 bundles	*45.00-47.00*
No. 2 bundles	*34.00-35.00*
Machine shop turnings	*28.00-30.00*
Mixed borings, turnings	*29.00-31.00*
Short shovel turnings	*32.00-33.00*
Low phos. (structural & plate)	*48.00-50.00*

Cast Iron Grades

No. 1 cupola	42.00-43.00
Unstripped motor blocks	*31.00-33.00*
Heavy breakable	46.00-47.00

Stainless Steel

18-8 sheets, clips solids	320.00-325.00
18-8 borings, turnings	150.00-160.00
430 sheets, clips, solids	120.00-125.00
410 sheets, clips, solids	100.00-105.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*42.50-43.00*
No. 2 heavy melting	*33.50-34.00*
No. 1 bundles	*42.50-43.00*
No. 2 bundles	*32.00-32.50*
No. 1 busheling	41.00
Machine shop turnings	*26.50-27.00*
Mixed borings, turnings	*28.00-28.50*
Short shovel turnings	*30.00-30.50*
No. 1 cast	40.50-41.00
Mixed cupola cast	38.00-39.00
No. 1 machinery cast	42.00-43.00

BUFFALO

No. 1 heavy melting	*50.00-51.00*
No. 2 heavy melting	38.00-39.00
No. 1 bundles	*50.00-51.00*
No. 2 bundles	35.00-36.00
No. 1 busheling	*50.00-51.00*
Mixed borings, turnings	28.00-29.00
Machine shop turnings	*27.00-28.00*
Short shovel turnings	29.00-30.00
Cast iron borings	28.00-29.00
Low phos.	52.00-53.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	48.00-49.00
No. 1 machinery	51.00-52.00

Railroad Scrap

Rails, random lengths	58.00-59.00
Rails, 3 ft and under	64.00-65.00
Railroad speecialties	55.00-56.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*50.00-51.00*
No. 2 heavy melting	*42.00-43.00*
No. 1 bundles	*50.00-51.00*
No. 2 bundles	*39.00-40.00*
No. 1 busheling	*50.00-51.00*
Machine shop turnings	*32.00-33.00*
Mixed borings, turnings	*32.00-33.00*
Short shovel turnings	*34.00-35.00*
Cast iron borings	*32.00-33.00*
Low phos., 18 in.	*56.00-57.00*

Cast Iron Grades

No. 1 cupola	*47.00-48.00*
Heavy breakable cast	*44.00-45.00*
Charging box cast	*44.00-45.00*
Drop broken machinery	*56.00-57.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*52.00-53.00*
Rails, 18 in. and under	*67.00-68.00*
Rails, random lengths	*60.00-61.00*

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	*42.50*
No. 2 heavy melting	*39.00*
No. 1 bundles	*42.50*
No. 2 bundles	*35.00*
No. 1 busheling	*45.00*
Machine shop turnings	*28.00*
Short shovel turnings	*29.50*

Cast Iron Grades

No. 1 cupola	47.00
Charging box cast	*42.00*
Heavy breakable cast	*40.00*
Unstripped motor blocks	38.00
Brake shoes	43.00
Clean auto cast	48.00
Stove plate	*42.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*53.50*
Rails, 18 in. and under	*69.00*
Rails, random lengths	*64.50*
Rails, rerolling	*70.50*
Angles, splice bars	*60.50*

SEATTLE

No. 1 heavy melting	38.00
No. 2 heavy melting	*33.00-35.00*
No. 1 bundles	*35.00*
No. 2 bundles	26.00
No. 3 bundles	17.00
Machine shop turnings	15.00-16.00
Mixed borings, turnings	15.00-16.00
Short shovel turnings	15.00-16.00
Electric furnace, bundles	52.00-55.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	*42.00*
Heavy breakable cast	33.00
No. 1 wheels	35.00
Unstripped motor blocks	30.00
Clean motor blocks	35.00
Stove plate (f.o.b. plant)	30.00
Brake shoes	30.00

Railroad Scrap

Rails, random lengths	38.00

LOS ANGELES

No. 1 heavy melting	42.00
No. 2 heavy melting	36.00
No. 1 bundles	39.00
No. 2 bundles	32.00
Machine shop turnings	*17.00*

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	46.00

SAN FRANCISCO

No. 1 heavy melting	36.00
No. 2 heavy melting	30.00
No. 1 bundles	35.00
No. 2 bundles	26.00
No. 1 busheling	36.00
Machine shop turning	20.00-23.00
Mixed borings, turnings	20.00-23.00
Cast iron borings	20.00-23.00
Short shovel turnings	25.00
Cut structurals	45.00
Heavy turnings	20.00-23.00
Punchings & plate scrap	44.00

Cast Iron Grades

No. 1 cupola	45.00
Charging box cast	35.00
Stove plate	39.00
Heavy breakable cast	36.00
Unstripped motor blocks	32.00
Brake shoes	35.00
Clean auto cast	45.00
No. 1 wheels	39.00
Burnt cast	23.00
Drop broken machinery	50.00

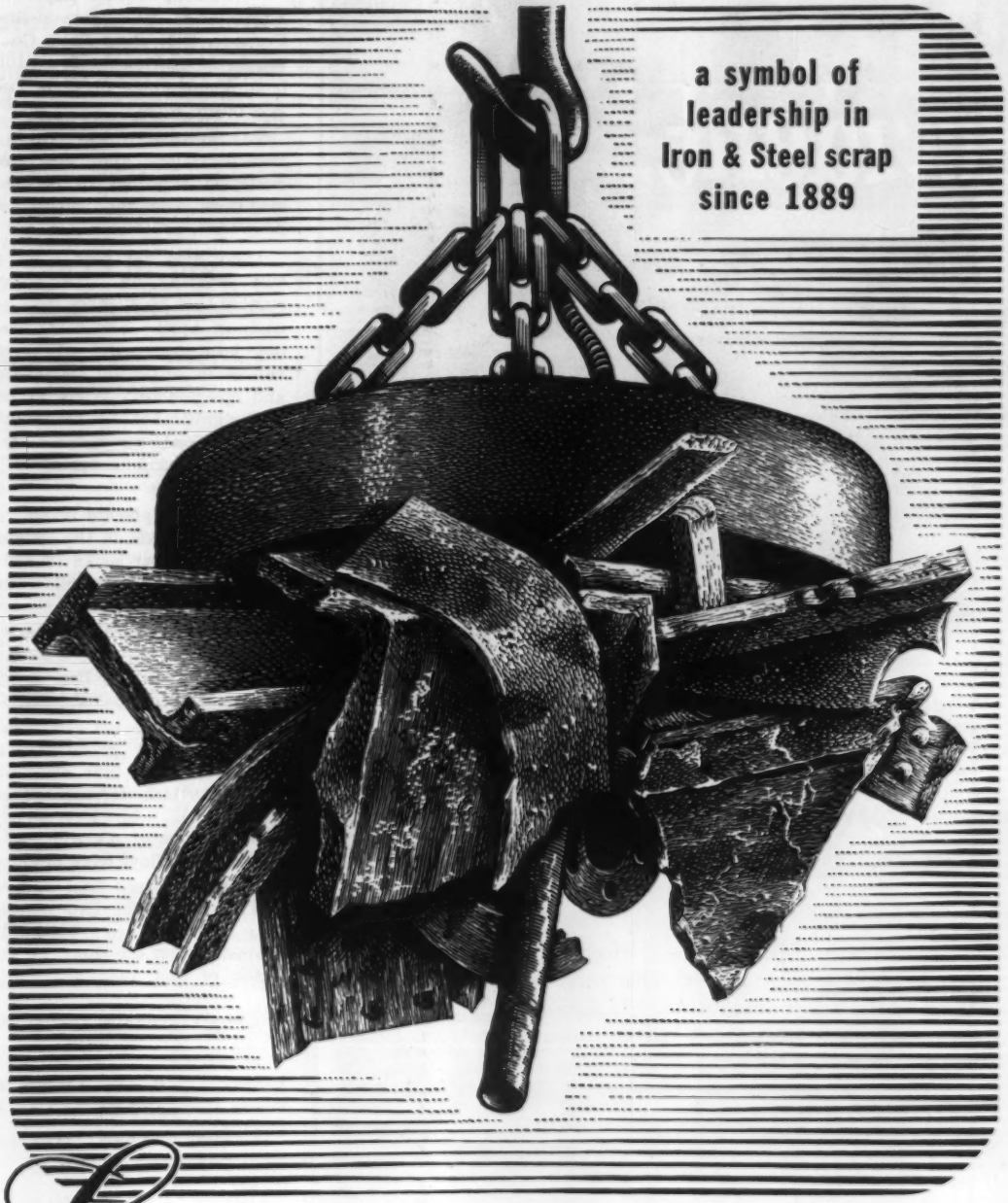
HAMILTON, ONT.

No. 1 heavy melting	45.50
No. 2 heavy melting	41.50
No. 1 bundles	45.50
No. 2 bundles	38.00
Mixed steel scrap	38.00
Mixed borings, turnings	19.00
Rails, remelting	54.50
Busheling, new factory: Prepared	43.50
Unprepared	39.50
Short steel turnings	27.50

Cast Iron Grades†

No. 1 machinery cast	42.00-45.00

†F.o.b., shipping point.



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(*Concluded from page* 149)

burgh Coke & Chemical, Shenango Furnace, Bethlehem Steel Co., Tonawanda Iron, Phoenix Iron, Interlake Iron, Youngstown Sheet & Tube and Wisconsin Steel.

The increase, which reflects higher transportation and raw material costs, is expected to become general throughout the industry over the next week or so at latest.

There also has been some protective covering on coke, because of rumors that an advance may be made early in April. And consumers have not been unmindful of recent advances in prices on ferromanganese and spiegeleisen. Some attach special significance to these increases as they relate to pig iron; and also to the reports of possibly higher prices on coke.

Pig iron shipments in March were at capacity level in the Chicago district, and order books of sellers indicate that April will follow the same pattern.

Blast furnace production totaled 6,602,817 net tons in February, reports the American Iron & Steel Institute. This compares with 7,049,564 tons in January.

Of the total production in the month, 6,539,199 tons were pig iron and 63,618 tons, ferromanganese and spiegeleisen. In February, 1955, 5,394,585 tons of pig iron and 48,182 tons of ferroalloys were produced.

Production (pig iron and ferroalloys) in the first two months this year amounted to 13,652,381 tons, against 11,227,420 tons in the like period of last year.

BLAST FURNACE PRODUCTION
(Net Tons)

	1956		1955
Districts	February	2 Months	2 Months
Eastern	1,378,389	2,832,968	2,266,493
Pittsburgh-Youngstown .	2,275,456	4,720,051	3,949,637
Cleveland-Detroit	776,707	1,595,432	1,296,814
Chicago	1,351,005	2,786,984	2,360,389
Southern	508,881	1,044,361	826,336
Western	312,379	672,585	527,751
Total	6,602,817	13,652,381	11,227,420

Iron Ore . . .

Iron Ore Prices, Page 147

There are 100,000 tons of Nevada iron ore on Stockton, Calif., docks awaiting shipment to Japan. But lack of freighter space is delaying the movement. The pile-up has tied up several hundred gondola cars. One shipping line has offered to move 30,000 tons of the ore, but it asks rates ranging from $14 to $16 a ton, almost double its rates with Japanese steel mills a year ago.

Imports of iron ore into the U. S.

FACTORY SUPERINTENDENT FOR HEAVY INDUSTRIAL EQUIPMENT MANUFACTURER

AA-1 established company, located in Cleveland area, is seeking a man experienced in the fabrication, machining, assembly and electrification of heavy industrial equipment.

Send complete resume including education, experience and salary requirement.

Reply Box 394, STEEL
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WANTED BY LARGE REPUTABLE MANUFACTURER

A man experienced in the manufacture of seamless welding fittings to assume complete charge of this departmental activity to develop and expand it. In replying, please supply full information on experience and expected remuneration.

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SALES

Alloy, Stainless and Carbon Mill Sales Position with substantial future. Applicant must have experience in bar sales and knowledge of principal accounts in at least one area of large consumption. Salary open. Write in confidence stating complete qualifications.

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Electric Arc Furnace MELTER FOREMAN

for new operation.

Must be experienced

in

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Most modern and progressive steel foundry in the middle west. Advise full particulars.

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Familiar with stainless steel and high temperature alloys. Technical background preferred. Location western Michigan.

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Mgt. Consultants
Federal Square Bldg.
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Looking For
EXCLUSIVE REPRESENTATIVES

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TRANSFORMERS BOUGHT, SOLD AND REPAIRED
40 Years of Dependable Service

THE ELECTRIC SERVICE CO.
5329 Hetzel St., Cincinnati 27, Ohio

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ELECTRIC STEEL MELTING FURNACE

TILTING TYPE, 12' DIAMETER SHELL, TOP CHARGE, SWINGING ROOF TYPE, WITH OR WITHOUT TRANSFORMER AND ELECTRIC CONTROLS. MUST BE IN GOOD CONDITION.

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Pittsburgh Metallurgical Company, Inc.
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Niagara Falls, New York

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WORLD'S LARGEST INVENTORY
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350 Tons strictly No. 1 Relay Tie Plates.

Also new and relay rail, new track spikes, bolts and track turnouts for prompt shipment.

Write or Wire for Prices

SONKEN-GALAMBA CORP.
2nd and Riverview (X-252)
Kansas City 18, Kansas
ATwater 1-9305

last year totaled 23,443,220 gross tons valued at $177,359,813, reports the U. S. Bureau of Mines. Exports amounted to 4,501,478 tons in the year. Imports last year were:

IRON ORE IMPORTS—1955*

Country	Gross Tons	Value Per Ton	Total Value
Algeria	20,255	$12.10	$245,176
Brazil	1,010,129	11.11	11,224,489
Canada	10,072,091	7.85	79,025,454
Chile	1,058,899	5.25	5,557,330
Cuba	40,197	7.86	316,086
Dominican Republic	101,934	11.51	1,173,494
Liberia	927,988	7.60	7,048,791
Mexico	176,293	3.26	573,867
Peru	1,554,101	8.77	13,629,972
Sweden	1,221,334	10.10	12,334,640
United Kingdom	2,079	28.12	58,461
Venezuela	7,120,221	6.37	45,371,627
British W. Africa	137,699	5.81	800,426
	23,443,220	$7.57	$177,359,813

*Bureau of Mines data

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

5090 tons, nine grade separations, Connecticut turnpike project 304-02, Stamford, Conn., to Harris Structural Steel Co., New York; Gull Contracting Corp., Flushing, N. Y., general contractor.

3400 tons, buildings No. 20 and 21, state hospital, Kings Park, Long Island, to Lehigh Structural Steel Co., Allentown, Pa.

1600 tons, five state bridges, Northeast expressway, contract 5, Revere, Mass., to Harris Structural Steel Co., New York; C. J. Maney Co. Inc., Lexington, Mass., general contractor.

830 tons, transmission towers, Commonwealth Edison Co., Chicago, to Bethlehem Steel Co., Bethlehem, Pa.

800 tons, annex, Federal Reserve Bank, Birmingham, to Ingalls Iron Works, Birmingham; Daniel Construction Co., Birmingham, general contractor.

500 tons, bridges, sec.78F, Cook county, Ill., for state, to Bethlehem Steel Co., Bethlehem, Pa.

500 tons, bridge, sec. 19VF-1, Stephenson county, Ill., for state, to Bethlehem Steel Co., Bethlehem, Pa.

414 tons, bridge, sec. 28-2-8F, St. Clair county, Ill., for state, to Bethlehem Steel Co., Bethlehem, Pa.

375 tons, substation steel, to Bethlehem Pacific

CLASSIFIED

Help Wanted

SALES ENGINEERING METALLURGIST
Qualified man with metallurgical or tool engineering background to travel for Tool Steel Producer. Duties would include writing of technical bulletins, trouble shooting and sales promotion of tool steel products in conjunction with District Salesmen. Pittsburgh Headquarters. Write Box 399, STEEL, Penton Bldg., Cleveland 13, Ohio.

Positions Wanted

BLAST FURNACE SUPERINTENDENT TECHnical graduate, 43 years old. Firm knowledge labor relations, production, engineering, costs & organization. Experience: Blast furnace operations (extensive & varied); primary rolling & finishing mill technician; steel plant industrial engineering. Currenty wasting talent. Write Box 401, STEEL, Penton Bldg., Cleveland 13, Ohio.

FOR SALE

1200 H.P. Motor, Mfg.: General Electric Co., Type MT-30—Form A, 2300 V., 3 Phase, 60 Cy., 237 R.P.M., Wound Rotor Induction, 305 Amp. Primary, 830 Amp. Secondary.

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ANYTIME, ANYWHERE

"Accidents don't just happen, they are caused," says a safety expert. But regardless of when or how they occur, you should know that good service can reduce downtime and expensive delays.

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The NAMCO nameplate on your machine assures service — in emergency or normal situations — when and where you need it.

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(*Concluded from page* 149)

burgh Coke & Chemical, Shenango Furnace, Bethlehem Steel Co., Tonawanda Iron, Phoenix Iron, Interlake Iron, Youngstown Sheet & Tube and Wisconsin Steel.

The increase, which reflects higher transportation and raw material costs, is expected to become general throughout the industry over the next week or so at latest.

There also has been some protective covering on coke, because of rumors that an advance may be made early in April. And consumers have not been unmindful of recent advances in prices on ferromanganese and spiegeleisen. Some attach special significance to these increases as they relate to pig iron; and also to the reports of possibly higher prices on coke.

Pig iron shipments in March were at capacity level in the Chicago district, and order books of sellers indicate that April will follow the same pattern.

Blast furnace production totaled 6,602,817 net tons in February, reports the American Iron & Steel Institute. This compares with 7,049,564 tons in January.

Of the total production in the month, 6,539,199 tons were pig iron and 63,618 tons, ferromanganese and spiegeleisen. In February, 1955, 5,394,585 tons of pig iron and 48,182 tons of ferroalloys were produced.

Production (pig iron and ferroalloys) in the first two months this year amounted to 13,652,381 tons, against 11,227,420 tons in the like period of last year.

BLAST FURNACE PRODUCTION
(Net Tons)

	1956		1955
Districts	February	2 Months	2 Months
Eastern	1,378,389	2,832,988	2,286,493
Pittsburgh-Youngstown	2,275,456	4,720,051	3,949,637
Cleveland-Detroit	776,707	1,595,432	1,296,814
Chicago	1,351,006	2,786,984	2,360,389
Southern	508,881	1,044,381	826,336
Western	312,379	672,585	527,751
Total	6,602,817	13,652,381	11,227,420

Iron Ore . . .

Iron Ore Prices, Page 147

There are 100,000 tons of Nevada iron ore on Stockton, Calif., docks awaiting shipment to Japan. But lack of freighter space is delaying the movement. The pile-up has tied up several hundred gondola cars. One shipping line has offered to move 30,000 tons of the ore, but it asks rates ranging from $14 to $16 a ton, almost double its rates with Japanese steel mills a year ago.

Imports of iron ore into the U. S.

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SALES MANAGER

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Federal Square Bldg.
Grand Rapids, Michigan

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Pittsburgh Metallurgical Company, Inc.
3801 Highland Avenue
Niagara Falls, New York

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90 Pound Tie Plates

350 Tons strictly No. 1 Relay Tie Plates.

Also new and relay rail, new track spikes, bolts and track turnouts for prompt shipment.

Write or Wire for Prices

SONKEN-GALAMBA CORP.
2nd and Riverview (X-252)
Kansas City 18, Kansas
ATwater 1-9305

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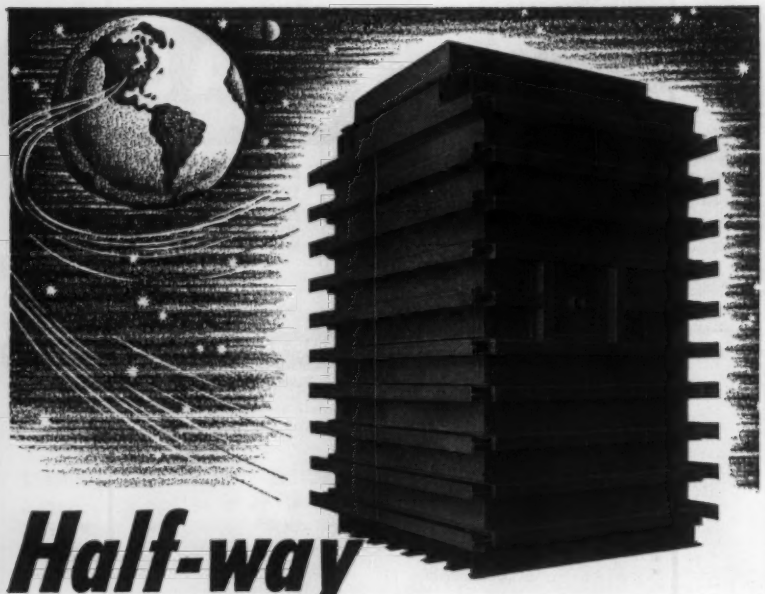

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Coast Steel Corp., Seattle, by Bonneville Power Administration, Portland, Oreg.

250 tons, local construction projects, to Star Iron & Steel Co., Tacoma, Wash.

STRUCTURAL STEEL PENDING

7700 tons, Calumet Skyway toll bridge project, design 7-D-1; bids Apr. 3, Department of Purchases, Contracts & Supplies, Chicago; furnishing and fabricating.

5000 tons, arresting gear and catapult, Navy, Lakehurst, N. J.; bids closed Mar. 29 following a postponement.

4000 tons, addition, University of Washington teaching hospital; bids to Board of Regents, Apr. 20.

3775 tons, Calumet skyway, sec. 7E, for City of Chicago; bids Apr. 6.

1300 tons, Willowbrook state school, Staten Island, N. Y., bids closed.

800 tons, eight-plane garage, Boeing Airplane Co., Moses Lake, Wash.; general contract to Howard S. Wright & Co., Seattle.

600 tons, junior high school, Upper Darby, Pa.; bids asked.

200 tons, engine house, Anchorage, Alaska; J. B. Warrack Co., Seattle, low at $291,000 to the Alaska Railroad.

100 tons, 156-ft, three-span Denali highway bridge, Alaska; bids to Alaska Road Commission, Juneau, Apr. 10.

REINFORCING BARS . . .

REINFORCING BARS PLACED

2200 tons, eight-plane hangar, Moses Lake, Wash., for Boeing Airplane Co., to Northwest Steel Rolling Mills Inc., Seattle; Howard S. Wright & Co. Inc., Seattle, general contractor.

REINFORCING BARS PENDING

1600 tons, Pelton dam, Deschutes river, Oreg.; Guy F. Atkinson Co., Portland, Oreg., is low at $6,534,349 to the Portland General Electric Co. on base bid.

1235 tons, Calumet Skyway toll bridge project, Chicago, design 7-D-3; bids Apr. 3, Department of Purchases, Contracts & Supplies, Chicago.

270 tons, three-story addition to accounting building, Seattle; John H. Sellen Co., Seattle, is low to the Pacific Telephone & Telegraph Co.; awarded.

150 tons, Washington state highway bridge, Jefferson county; general contract to Troy T. Burnham Co., Seattle, low at $171,084; awarded.

100 tons, including shapes, Wynooche river gravity dam; bids to Aberdeen, Wash., Apr. 4.

100 tons, Oregon state Yaquina river bridge; general contract to Tom Lillebo, Reedsport, Oreg., low at $149,059.

100 tons, Washington state highway projects; bids to Olympia, Wash., Apr. 10.

PLATES . . .

PLATES PLACED

1000 tons, liner plates, 8.25 miles 36-in. concrete cylinder water supply pipe, Mercer Island project, Seattle; general contract to Scheuman & Johnson, Seattle, low at $1,239,619; subcontract for pipe to American Pipe & Construction Co., Portland, Oreg.

PIPE . . .

CAST IRON PIPE PLACED

254 tons, 12 and 8-in., Everett, Wash., to U. S. Pipe & Foundry Co., Seattle.

200 tons, system expansion, Vancouver, Wash., to Pacific States Cast Iron Pipe Co., Portland, Oreg.

RAILS, CARS . . .

RAILROAD CARS PLACED

Atchison, Topeka & Santa Fe, three baggage-mail cars and three railway postoffice cars, to ACF Industries, New York.

Canadian Pacific, two rail diesel cars, to the Budd Co., Philadelphia.

Texas & Pacific, 230 freight cars to own shops at Marshall, Tex. List comprises 100 seventy-ton gondolas, 65 fifty-ton boxcars, 35 refrigerator cars and 30 seventy-ton covered hoppers.

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Looking for a tool steel to do a specific job? Want to know where to buy a finishing carbide? This guide has the answers. It is a single source of information on more than a thousand different tooling materials. Knowing the job to be done, you can determine, with the guide, what product to buy and where to buy it. Cross indexes make it easy to locate tool steels and carbides by tradename, or to compile a list of sources for a single type.

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40 PAGES

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101 to 200	1.70 ea.
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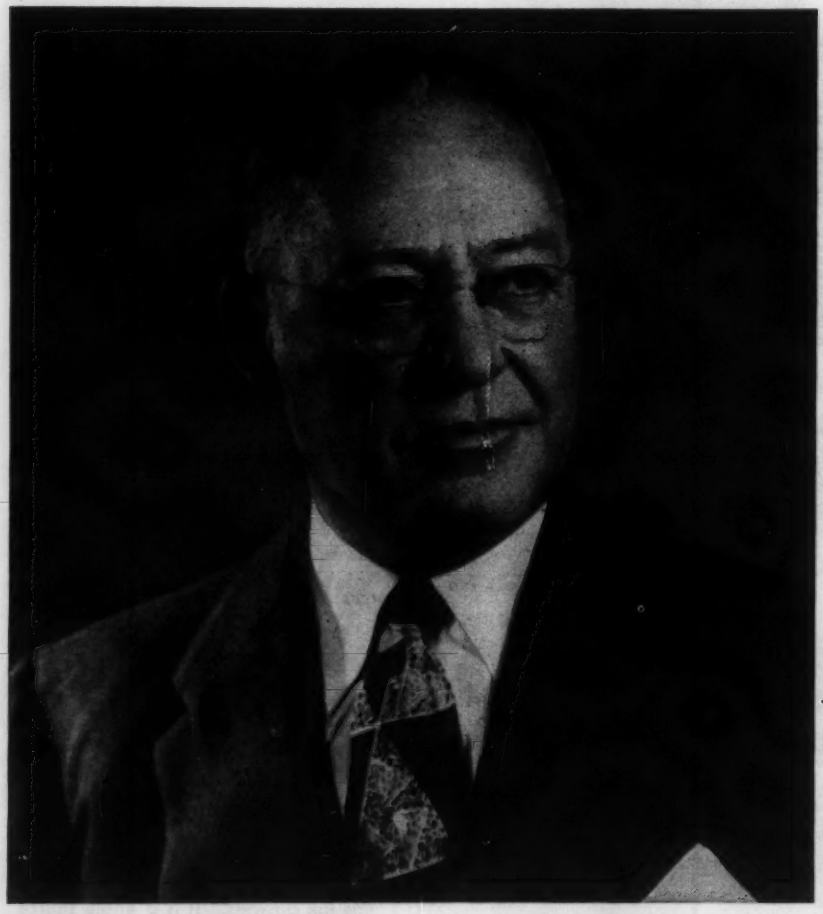

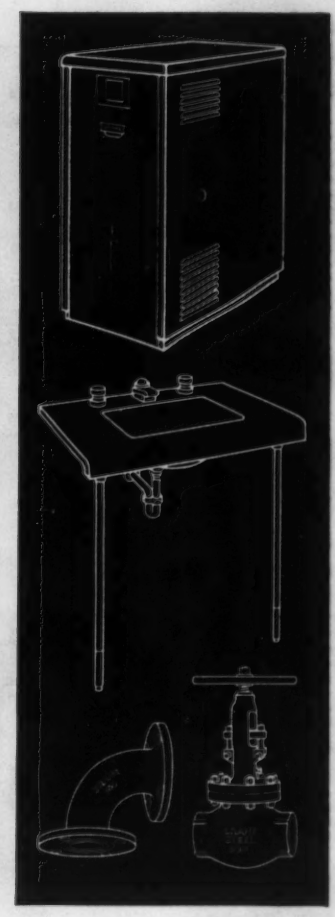

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FARVAL—
Studies in Centralized Lubrication
No. 183

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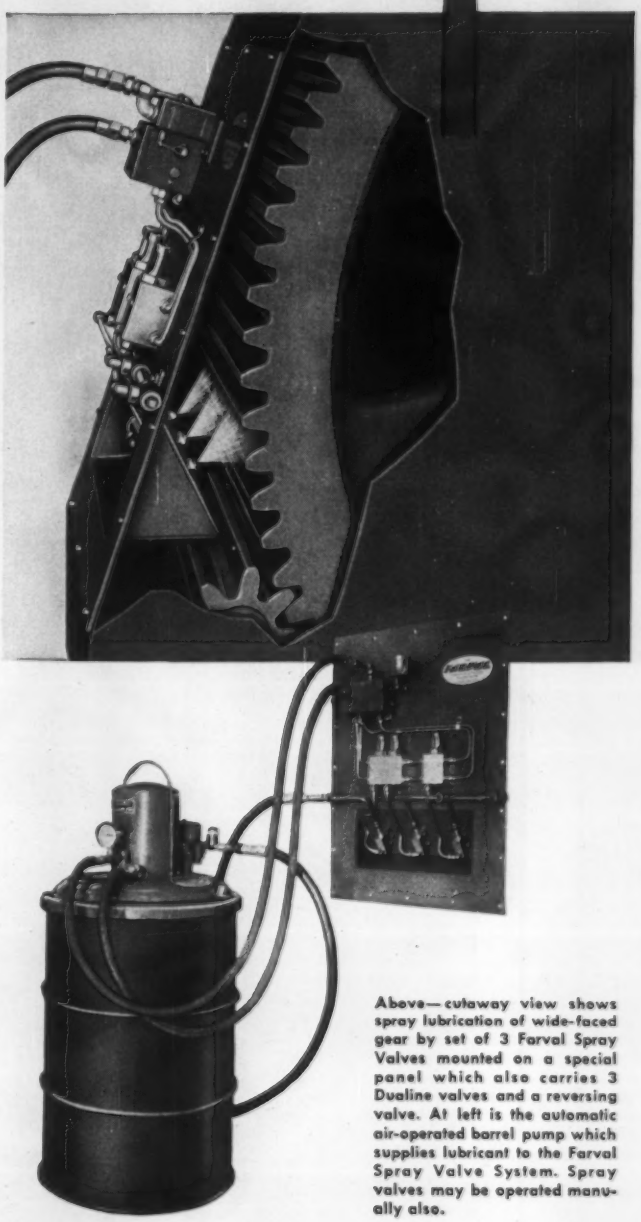

Above—cutaway view shows spray lubrication of wide-faced gear by set of 3 Farval Spray Valves mounted on a special panel which also carries 3 Dualine valves and a reversing valve. At left is the automatic air-operated barrel pump which supplies lubricant to the Farval Spray Valve System. Spray valves may be operated manually also.

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